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SOUTHERN GOOD

Good Southern Goods

SOUTHERN GOOD ROADS

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Road-Building Activity Around Bristol

By N. B. ReMINE

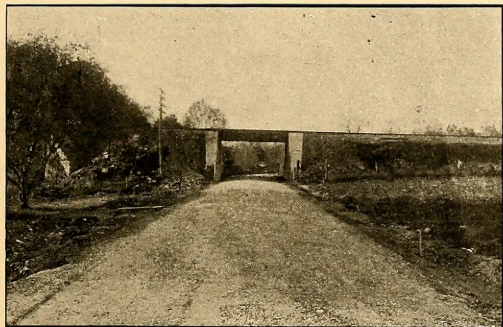
Secretary Board of Trade, Bristol, Va.-Tenn.

GRATIFYING strides have been made in the building of good roads in recent years in the portion of the Southern Appalachian region centering about Bristol. This is particularly true of the counties of Southwest Virginia and East Tennessee. A decade has brought wonderful changes, and from present indications one-half another decade will witness the completion of a system of stone highways extending through

ty, Tennessee, direct trade relation with Bristol, is also designed to be a link in the "Crest of the Blue Ridge Highway." It is probable that this road will make Bristol the northern terminus of this noted highway along the summit of the Blue Ridge, or that it will at least be considered so for some time to come.

The connection here of the Bristol-to-Memphis highway and the Bristol-to-Washington highway, work on each of which is going forward, will, at the present rate of progress, result in a through automobile route from Washington, D. C., to Memphis via Bristol and other important towns and cities in Tennessee and Virginia. It is more than likely, too, that this road will form an important link in the great national highway, connecting the south and west and the south and the east, now being advocated by this magazine.

The Bristol-to-Lexington highway, surveys for which are now being made in different counties along the proposed route, will be another important thoroughfare, giving a direct outlet from this region to the middle west through the gap in the Cumberland Moun-



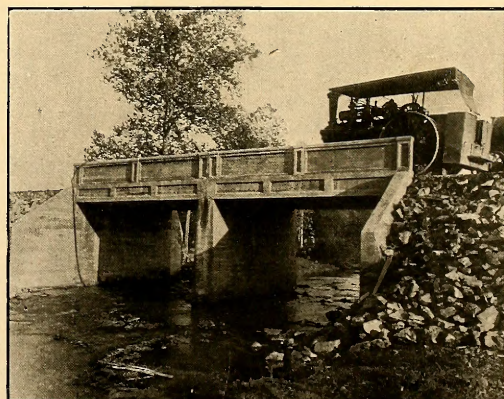
Undergrade Crossing Built by the N. & W. Railway Company on the Bristol-Washington Highway, Near Bristol

every county in this region and connecting with important through highways which are now being proposed or are in process of construction.

In this great movement the Bristol Board of Trade has had its share of honors, due mainly to the active work of its president, Henry Roberts, who has been a persistent road booster, and who is now enjoying some of the fruits of his positive efforts.

Both east and west of Bristol the good roads spirit has been active, and with this city as the center of an extensive district of improved roads, the day is not distant when Bristol will also be the focus for such important through roads as the Bristol-to-Memphis highway, the Bristol-to-Washington highway, the Bristol-to-Bluefield highway, the Bristol-to-Lexington (Ky.) highway, the Bristol-to-Wise County highway, the Bristol-to-Kingsport-Knoxville highway and the Bristol-to-Mountain City highway.

The last-mentioned highway, which has been built in part, and which is to give the people of Johnson coun-



Re-inforced Concrete Bridge on the Bristol-Washington Highway, Near Bristol

ty, Tennessee, direct trade relation with Bristol, is also designed to be a link in the "Crest of the Blue Ridge Highway," made famous by its association with the picturesque career of Daniel Boone, who traveled this path in moving westward into Kentucky, and will con-

nect the picturesque valleys and the vast coal fields of this region with the fertile bluegrass region of Kentucky, and will open the way for travel between the east and west over turnpikes now leading through portions of Kentucky and thence westward to Cincinnati, St. Louis and other cities in the west.

The Bristol-Kingsport-Knoxville turnpike, which has been almost completed between Bristol and Rotherwood, a distance of 30 miles, and which has been graded through most of Hawkins county, Tennessee, will constitute a second route southward from Bristol through the fertile valley of the Holston and by the quarries that hold immense deposits of the choicest marble to be found in Tennessee.

The Bristol-to-Bluefield highway, which has been graded and in part macadamized, except about 27 miles, extends through portions of Washington, Russell and Tazewell counties, Virginia, and besides giving direct connection with the extensive mining districts of West Virginia, opens a choice section of agricultural lands in the counties of Russell and Tazewell in Virginia, making possible wonderful developments among the farmers of one of the richest portions of Virginia, naturally.

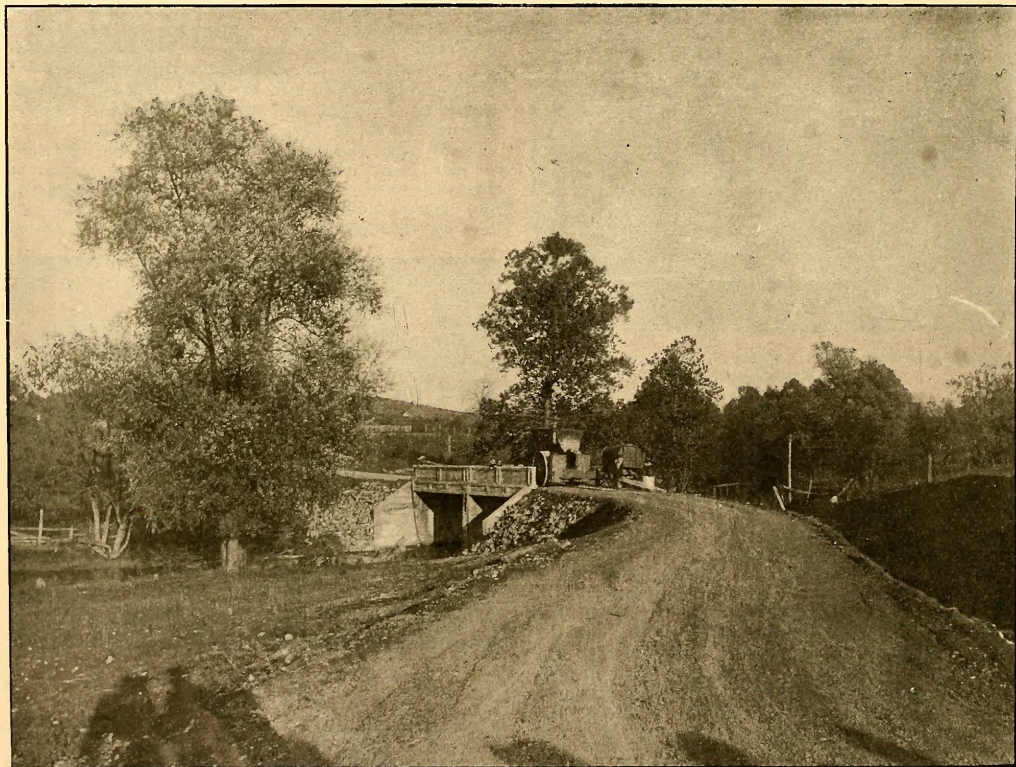
The promotion of these important through highways by the Bristol Board of Trade has had the effect to quicken the work of highway construction in all the adjoining and adjacent counties, so that the combined results show up splendidly for the loyal band of good-roads boosters who have been devoting their time to

highway promotion in the counties of Southwest Virginia and East Tennessee.

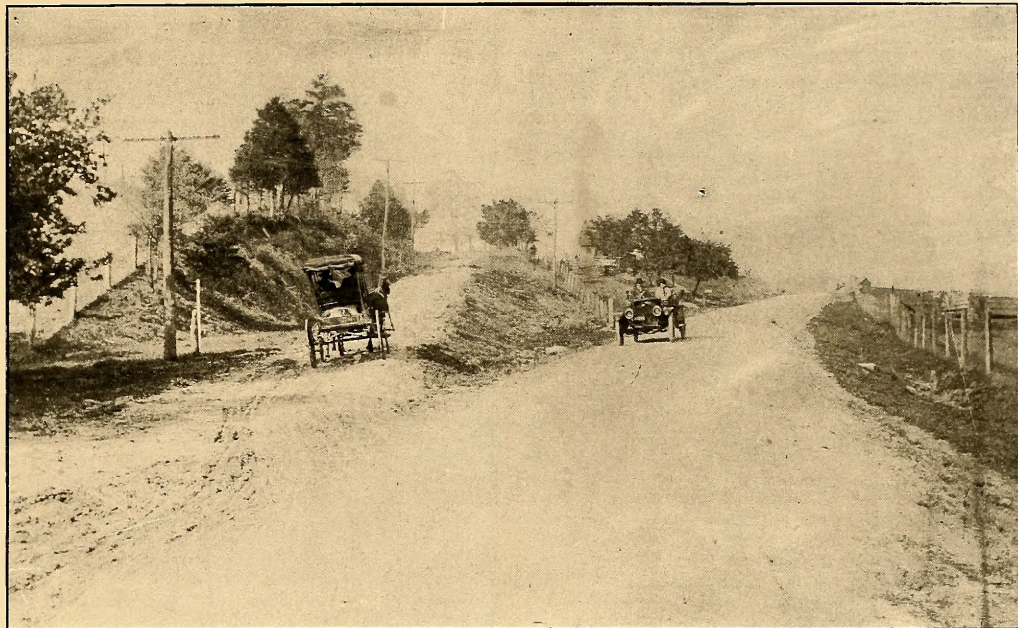
The results have been far-reaching in their scope. With improved roads have come improved methods of farming. The farms are being better kept, and throughout the rural districts better homes are being built, better schools and more pretentious edifices are being provided. Along with these things have come a general desire for better farming and improved breeds of livestock, while many of the farmers, in addition to their carriage horses, have provided themselves with automobiles as a means of keeping up with the general trend for speed and convenience in travel.

Another result has been the stimulation of inquiry for lands and homes in the region. Farming lands have increased in value and men of thrift from other sections have continued to seek homes and investments in the counties that have shown a progressive spirit in the matter of providing good roads.

In order that the accusation may not be brought that this general estimate is overdrawn, it will not be out of place to go somewhat into detail by showing what the counties within a radius of 100 miles of Bristol have done within the last few years in the matter of providing good roads. While most of the work has been accomplished in the last five or six years, the earliest bond issues in certain of the East Tennessee counties included in this area go back one decade. However, the large majority of bond issues have been made within the last five years. These counties have



Section of Fine Macadam and a High Type of Re-inforced Concrete Bridge on the Bristol-Washington Highway, near Bristol



The Old and New Roads. A Scene on the Bristol-Kingsport-Knoxville Highway, Showing the Primitive Way of Selecting Grades and the New

undoubtedly been leaders in the good-roads movement. This assertion is borne out in the following figures, showing bond issues authorized and money expended and being expended in the construction of modern stone-surfaced highways:

| East Tennessee Counties | Authorized. | Not yet expended. |
|---------------------------------|-------------------|----------------------|
| Sullivan | \$500,000 | \$100,000 |
| Carter | 60,000 | 20,000 |
| Washington | 60,000 | ..... |
| Greene | 750,000 | 500,000 |
| Hamblen | 325,000 | ..... |
| Jefferson | 519,000 | 100,000 |
| Cooke | 200,000 | ..... |
| Hawkins | 200,000 | ..... |
| Grainger | 200,000 | ..... |
| | <hr/> \$2,814,000 | <hr/> \$720,000 |
| Southwest Virginia Counties. | | |
| Washington | \$200,000 | \$70,000 |
| Smyth | 325,000 | 250,000 |
| Wythe | 60,000 | ..... |
| Pulaski | 170,000 | 100,000 |
| Lee | 430,000 | 80,000 |
| Wise | 960,000 | 100,000 |
| Russell | 575,000 | 225,000 |
| Tazewell | 625,000 | 175,000 |
| Scott | 167,100 | 167,100 |
| Dickenson | 86,000 | 70,000 |
| | <hr/> \$3,598,100 | <hr/> \$1,237,100 |

The above figures, aggregating \$6,412,100, are correct. The figures representing the funds not yet expended are estimated in some instances. The \$60,000 expended in Wythe county, Virginia, was raised by direct

levy from year to year. All the other funds were raised by bond issues.

In addition to the foregoing, approximately \$600,000 has been expended for bridges in the counties mentioned in the two states, the bridge funds being raised, as a rule, by direct levy or short-time bond or note issues, the state-aid fund in Virginia being available in some instances for highways and bridges.

It was following the movement inaugurated in Tennessee to build the trans-state highway from Bristol to Memphis that the Bristol Board of Trade, realizing the importance of concentrating the public mind upon the main county, inter-county and inter-state highways, took up and began the advocacy of the construction of the Bristol-to-Washington highway and other important through roads mentioned in the foregoing. These roads represent the following mileage:

| | Miles. |
|---------------------------------------|--------|
| Bristol-Memphis | 550 |
| Bristol-Washington | 400 |
| Bristol-Bluefield | 92 |
| Bristol-Lexington, Ky. | 250 |
| Bristol-Wise county | 85 |
| Bristol-Kingsport-Knoxville | 130 |
| Bristol-Mountain City | 35 |

Taking these up in order: The Bristol-Memphis highway has been graded and drained from Bristol to Knoxville, except about ten miles in Washington county and about 8 miles in Greene county. Including the macadam work to be done this fall, this road has all been macadamized, except about 12 miles in Washington county and the whole distance through Greene county and possibly two miles in Sullivan county. Greene county will grade and macadamize the road through that county next year, the bonds having been voted.

During the spring of 1912 the Bristol-Washington

highway was located and surveyed by the State Highway Commission of Virginia, from Bristol to Roanoke, 150 miles. About half of the 30 miles of this road through Washington county has been macadamized, and the funds have been provided to grade and macadamize the residue.

From the Smyth county line to Roanoke the road follows the old Valley Pike, built by the State of Virginia 60 years ago, and the roadbed is good, but needs resurfacing, and Smyth, Wythe, Pulaski and Roanoke counties are now engaged in resurfacing the same, Montgomery being the only county not at work.

The Bristol-Bluefield highway, 92 miles, will all be graded and macadamized this winter except 27 miles.

Lee county, Virginia, has built about 35 miles of the Bristol-Lexington (Ky.) highway, leaving 15 miles in that county not provided for. Washington county has provided for, but not built, the 12 miles through that county and Scott county has voted bonds to build 25 of the 35 miles through that county.

From Middlesboro, Ky., to Crab Orchard, Ky., there are 98 miles to be graded and macadamized, for which no funds have been provided. At Crab Orchard the road runs over the system of pikes about 50 miles to Lexington.

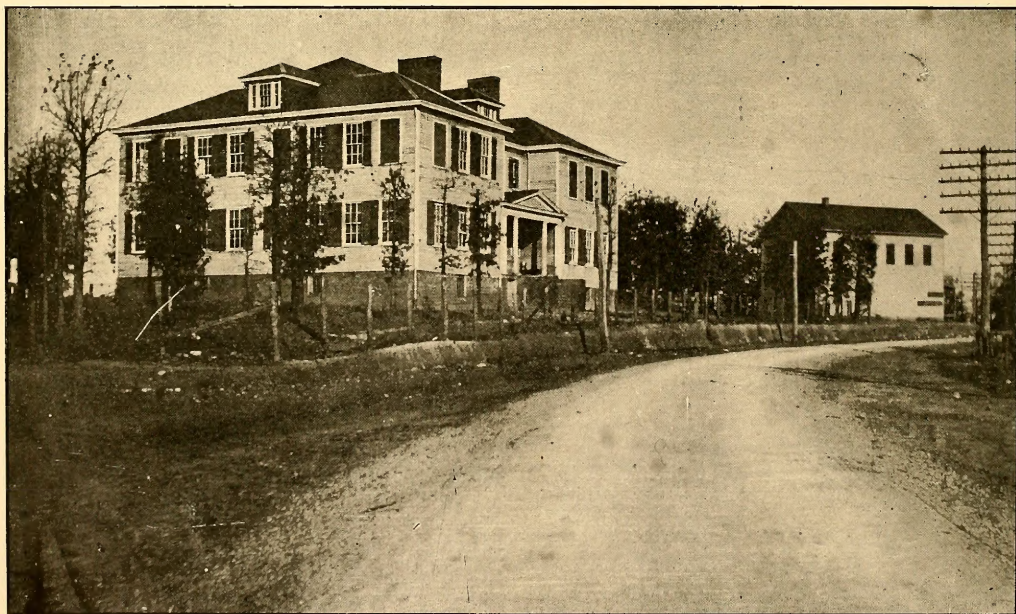
A part of the funds have been provided with which to build the Bristol-Wise County highway through Washington county; Russell county has 15 miles of this road built and 7 to provide for, and Wise county has graded the 40 or more miles through that county and will macadamize all of the same but 15 miles this year. An additional bond issue will be necessary to macadamize this 15 miles, but it will, it is expected, be voted this winter.

Sullivan county, Tennessee, has graded 22 of the 25 miles of the Bristol-Kingsport-Knoxville highway, and macadamized 17 miles of the same. Hawkins and

Grainger counties have graded all of this road through those counties, and macadamized a small portion of the same. This road has been graded through Knox county, and some of it macadamized.

Sullivan county has graded and macadamized 10 miles of the Bristol-Mountain City and Crest of Blue Ridge highway, and will, it is believed, complete the road to Johnson county line, but if this work should be delayed, President W.H. Aston will welcome the Crest of the Blue Ridge highway, over the 10 miles of macadam road from Damascus, to his home at Meadow View, on the Bristol-Washington highway, and Washington county, Virginia, will carry this road to the Johnson county (Tennessee) line, near the foot of White Top Mountain, and the Bristol Board of Trade has been assured by Johnson county people that they will build through that county from the North Carolina line to both the Sullivan county, Virginia, lines.

Besides these main roads, most of the counties mentioned have provided a system of good roads extending through practically every civil district. In the Virginia counties the work has been accomplished almost altogether by districts. Bond issues are usually voted by county districts in Virginia and the money used as the supervisors of each district may deem best. In Tennessee the process is different. One commission has entire charge of the work covering the county, and the county court, which is composed of the magistrates of the several civil districts, determines how the money is to be spent and authorizes a plan of construction with a view to giving each section of the county its portion of the benefits. The fact that the first bond issue made in a county under this plan is usually not sufficient to provide anything like a general system, results in demands from all parts of the county for the extension of good roads, and this demand results in a system. This is true of the work in Sullivan county, and is true

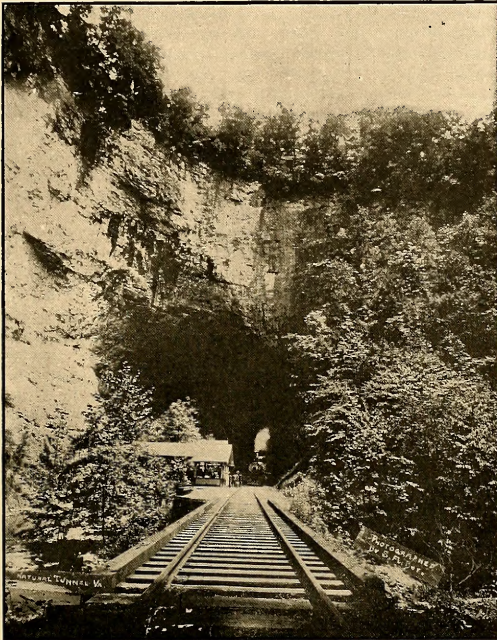


A Public School Building on the Campbell Court House Road, in Campbell County, Virginia. This County Has Many Miles of Fine Macadam Roads and it is These Roads That Make Such School Buildings Possible

of the work in all the other East Tennessee counties.

Perhaps there is no one agency that has done more to stimulate the good-roads spirit throughout Tennessee than the project to build a trans-state highway from Bristol to Memphis. It is believed that the building of the Bristol-to-Washington highway will have a similar effect upon the counties of Virginia when finally construction gets under way on all sections of the route.

The Bristol Board of Trade will take up the promotion of the Bristol-Norfolk highway this winter, and will continue its promotion work until the several through highways inaugurated at its suggestion shall have been connected up, and when this is finally accom-



The Famous Natural Tunnel Near Bristol, Virginia

plished, it is doubtful if it can then be said that any two States in the South surpass Tennessee and Virginia in the important item of improved roads and all the betterments that follow naturally in the wake of good highways.

The fact that the Southern Appalachian Good Roads Association, which held its fifth annual convention at Asheville, N. C., October 22 and 23, accepted the Bristol Board of Trade's invitation to hold its next annual convention in this city will have the effect, it is hoped, to materially heighten the good-roads spirit throughout this region. In consideration of the coming of this meeting next fall, President Roberts of the Bristol Board of Trade is already planning for important new features in the road promotion campaign of this organization, and it is his purpose to use information of the acceptance of the invitation to hold the next convention of the Southern Appalachian Good Roads Association in Bristol as an inspiration to the people of this entire region touching the subject of road-building. His latest suggestion is a through highway from Bristol to Pittsburgh, the same to be an extension of the Bristol-to-Bluefield highway.

Twenty Five Governors Favor Working Convicts on the Roads.

Twenty-five governors have placed themselves on record as favoring the working of convicts in the construction and repair of highways, according to a compilation of the discussions of prison labor in their last messages to the legislature, recently issued by the National Committee on Prison Labor.

Convict road work is advocated by the governors both because of the healthful nature of such work and owing to the fact that convicts who have been employed in this way can more readily find employment when released; while many of the governors also point out the benefit to the public from better roads secured at a minimum cost.

Governor Dunn of Illinois states that humanitarian reasons underlie the employment in open air work of this sort wherein and whereby the convicts are restored to society with their manhood quickened instead of deadened or destroyed.

Governor Oddie of Nevada, who was instrumental in securing the passage of the legislation which provides for convict road work in that state is enthusiastic as to the success of the plan:

"There is no question," he maintains, "but that the passage of this law has had a wholesome effect on our prison system, and has been the means of giving a new start in life to a large proportion of the discharged and paroled men. About 40% of the total number of our convicts have been performing good service under the honor system at the road camp."

Governor Hanna of North Dakota, Governor Cox of Ohio and Governor West of Oregon hold that outdoor work should be a privilege to be earned by good conduct; Governor Mann of Virginia testifies to the efficiency of the convicts when employed on the roads and cites figures to prove the economy of such work, maintaining however that the present cost can be greatly reduced by placing the men on their honor and lessening the number of idle guards; while Governor McDonald of New Mexico and Governor Carey of Wyoming refer to the few attempts at escape that have been made by convicts practically unguarded.

Governor Hunt of Arizona is in favor of paying the convicts at least 25 cents a day for their services as the cost will be small compared to the actual benefit derived by the construction of splendid highways, while the benefit accruing to society will return the investment a thousand fold.

The consideration given to convict road work by the governors is an indication of the importance attached to the matter by the people throughout the country. The governors present many different viewpoints but a careful study of their statements shows that road-work, when conducted on a basis fair to the convict and the state, will go far towards solving both the convict labor problem and the problem of good roads.

An Illinois editor boasts his state is spending \$2,800,000 on good roads work, the expenditures to be made in two years time. That may be big for Illinois, but it is not from the Texas viewpoint. One county of Texas—Tarrant—is spending \$1,600,000 on highways, the expenditure to be completed inside of two years. Texas in the first five months of 1913, provided, through the action of 22 counties, for the expenditure of more than twice as much as all of Illinois has allotted to two years of good road work, to be exact, \$3,690,000.

Hernando county, Florida, voted a bond issue of \$200,000 for road construction on Dec. 13.

Inter-Dependence Between Good Roads and the Rural Mail Service

By HON. P. V. DeGRAW

Former Assistant Postmaster General

THAT the Post Office Department should be interested in the building and improvement of the highways throughout the country is but natural when consideration is given to the fact that many millions of dollars are expended annually in the maintenance of the rural mail service, and that during the course of a year rural and star carriers travel the enormous total distance of nearly 400,000,000 miles of roads.

The department expects of the beneficiaries of this service that they shall maintain the highways in such condition as to insure the delivery of mail at all seasons of the year with celerity, certainty and regularity, and unless this is done the service is curtailed or withdrawn entirely. As a result of the department's insistence on the maintenance of good roads, and of its co-operation, through postmasters and rural carriers, with state highway officials and good roads associations, it is believed that during the past six years greater interest has been engendered in the good roads question, more money appropriated, and more work accomplished than during any other like period in the country's history.

In the results achieved the postmasters and rural carriers of the country have played an important part and much credit is due to their zeal and untiring efforts. In a large number of states the highway officials have requested the department to permit rural carriers to co-operate with them in securing information and data pertaining to highways, their condition, and the lack of availability of suitable road-building materials. In many instances postmasters and rural carriers have taken the initiative in forming good roads associations whereby vast sums have been provided for the improvement of the entire system of highways in different localities. In numerous other instances the postal employes have arranged for and held through the counties in which they reside series of good roads meetings and secured the attendance of officials from the National Bureau of Good Roads, or others skilled in road-building, to address and inform those in attendance on proper road-building and the methods and materials which might be most effectual.

It is conceded by those interested in the good roads movement that rural delivery and the attitude and co-operation of the post office department have given greater stimulus to the subject and have been productive of greater results than all other causes combined, and the rule prescribed by the Postmaster General is that every postmaster and every rural carrier shall continue this co-operation as far as he can consistently with his duties.

While it is perhaps generally understood that the department requires all roads on which rural delivery is established to be maintained in condition to be traveled with facility and safety at all seasons of the year, I believe that the reasons for this requirement are not well understood or appreciated. Then, again, people of various communities have different standards, and what would be considered a good or fair road in one section of the country would be considered a very poor one in another.

When service is suspended on a rural route, com-

plaints are sometimes received from those who are thus deprived of the delivery of mail by rural carrier, that the road is being traveled, and if others can get over it why not the rural carrier. But such complainants lose sight of the fact that a rural carrier is required daily to travel his route, varying from fifteen to thirty miles in length, without regard to climatic conditions, while some of the people may by dint of floundering and plodding get through what would be reasonably classed as an impassable road, or might, with much difficulty, get over a stretch of road four or five miles in length. Rural carriers can not be and are not expected to travel roads hub-deep in mud or roads that may be in such condition as to cause hardship to the carrier's animals or loss of time to the carrier.

The interest of the department in the good roads question is paramount, for the reason that the 42,180 rural carriers employed are daily traveling more than 1,000,000 miles of roads, and in the course of a year these carriers travel nearly 400,000,000 miles of roads. It is therefore essential that the roads be maintained in good condition for travel in order to insure uninterrupted and expeditious delivery and collection of mail on rural routes on a uniform and dependable schedule. In the maintenance of the service many millions of dollars are expended each year, and the post office department expects its beneficiaries to see that the highways are maintained in proper condition. Some five or six years ago the post office department adopted the policy of insisting that the roads on which rural delivery is in operation shall be kept in good repair or service would be withdrawn therefrom; and also to co-operate with state highway commissions, good roads associations, local highway officials, and others interested, in securing the improvement of highways and to encourage postmasters and rural carriers to do likewise. The department very much desires that each postmaster, rural carrier and substitute carrier shall not only constitute himself an apostle of good roads and spread the propaganda, but that they shall, by their works, arouse interest and emulation in others.

While these improvements have redounded to the great benefit of the rural delivery service, the direct and indirect material benefit to the farmers and other rural residents have been incalculable. Strange as it may seem, farmers do not fully appreciate the value of good roads to themselves in that such roads enable them to get their produce to market at any time during any season of the year with ease and facility and with a minimum of wear and tear on their animals and vehicles. When the roads are poor, farmers are unable to take advantage of the best market prices, but can only do their hauling during the dry season or when the roads are dried out. The saving in the cost of horses where the roads are improved is enormous, for there can be no doubt that good roads prolong the usefulness of horses at least one-third. It is also a generally acknowledged fact that good roads are not only an indication of thrift, but that they enhance farm values and encourage and promote rural social intercourse and interests.

The fact that but comparatively few of the counties

throughout the country are financially able to undertake the building of the highest class of macadam roads is appreciated, but this should neither discourage nor deter their people in their efforts to procure good roads. It has been fully demonstrated that the best of earth and clay roads may be had through the use of the split-log-drag and other simple and inexpensive implements for glaring and ditching roads. Instruction and advice on road building or materials are to be had upon application to the Department of Agriculture, Bureau of Public Roads, Washington, D. C., and skilled highway engineers are detailed by the department of agriculture under certain conditions to furnish practical demonstrations in road building. Besides, the various state highway commissions and boards are all ready and willing to lend their aid. To my mind, there is little if any excuse in a majority of cases for the existence of poor roads.

Prior to the introduction of rural delivery those who resided in the rural sections of the country were required to go or send to the post office to receive and dispatch their mail, in many instances traveling many miles. This necessitated the abandonment of their work and the withdrawal of a team of horses from service on an average of at least three times a week. The rural mails, whereby practically all the facilities of the postal service are brought close to the homes of a majority of the rural population, has changed all this. To give to the rural residents these facilities is costing the enormous sum of approximately \$46,000,000 a year. It is not, therefore, unreasonable to expect and to require that the roads on which the mails are carried and delivered shall be maintained in good condition.

The Bureau of Roads of the Department of Agriculture has compiled figures which show that the aggregate amount which will be expended by state and county authorities during this year (1913) in road improvement will be approximately \$150,000,000. Several of the states have joined official hands to have a "Royal Road," to be one of the finest scenic highways in the world. A stretch of about one thousand miles of this interstate road has been completed, and it is now possible to drive an automobile from Cheyenne to El Paso with but one short break at Albuquerque. Even the railroads are aiding the movement. The Santa Fe system is building a magnificent scenic highway along the margin of the Grand Canyon.

Why Atlanta Was Chosen

Mr. Logan Waller Page, director of the U. S. Office of Public Roads, writes concerning the 1914 convention of the American Highway Association, of which he is president, as follows:

"The main reasons for selecting Atlanta were: First, that we considered more good could be done by holding the congress there than in any other southern state, as Georgia is one of the few southern states, which has no highway department, although it is spending much money on road work; second, it seemed, on account of its central location in the south, more convenient for the attending delegates than any other city with equal facilities. It is my belief that the congress will be the largest road congress ever held and that the exhibits will be the best ever made at a road meeting."



BEFORE IMPROVEMENT

This Shows the Road Force of Edgecomb County, N. C., Preparing to Begin Work on the Transformation of a Bad Section of Road into a U. S. Object Lesson Road
Mr. E. O. Hathaway, Engineer from the U. S. Office of Public Roads, Stands in the Road in Front of the Gang. T. P. Jenkins, County Road Superintendent, Stands at the Side of the Road

Protection and Upkeep of Road Equipment

By **DANIEL J. HAUER**

Construction Economist and Consulting Engineer

NO MATTER whether roads are built by contractors or by day labor forces under the direction of engineers, the item of plant and equipment is one of the prominent factors of cost. Inadequate plant means to materially increase the cost of construction. Only recently the writer stood watching some road building upon which only a few tools were being used, and most of them were ill-adapted to the work. It was difficult to accurately calculate the exact amount of money that was wasted, due to a lack of road equipment, but it was easily estimated that the cost of construction was increased at least twenty-five per cent. Likewise, too much plant can make an added cost. Even with the proper plant, and handled in an efficient manner, the plant item in road construction is a larger per cent of the total cost of the work than in most other classes of construction. This is due to two causes. First, the plant necessary to build a wagon road is much more expensive than that to build, to illustrate we will say a railroad. With light grading on both, the same equipment will be needed to do the excavation. For the railroad a small concrete mixer may be needed, and some track-laying tools to complete the job. On the other hand, for the wagon road there will be much hauling of road materials, thus wagons and a traction engine will be needed, then road scrapers or graders, and spreading machines, water sprinklers, oil sprinklers, and heating apparatus will be necessary; scarifiers, harrows and rollers must be used, while for concrete culverts and bridges, mixers, derricks, buckets, barrows, and other appliances are called for to do the job in an efficient manner. The writer has constructed a section of a railroad costing about \$100,000, with a plant costing only about \$5,000, while a contract for less than \$50,000 of wagon road work took an outfit costing nearly \$20,000; forty per cent of the total cost instead of five.

The second reason for the larger cost of plant for wagon road construction is that this class of work is let out in small scattered contracts that are uneconomical from a constructive standpoint. The season, too, for road building in nearly every section of the country is short.

Naturally the life of any machine is dependent upon the use and care given it. The longer the life, the less the annual depreciation, consequently some of the high plant cost can be eliminated from road construction by the proper care and upkeep of the equipment, and by selecting the most improved and economical types.

As far as possible the same machines should be used for many different purposes. This can be done in two ways: By trying out machines designed for one particular kind of work, for other kinds, and by adding attachments to machines that thus adapt them to three or four different things.

To illustrate, a contractor once found by experimenting that a certain kind of road grader would spread crushed stone for macadam at a very much less cost than it could be done by any other known methods, at that time. Then a road roller that can be used as a traction engine, with a scarifier attachment, and likewise for operating a stone crusher, or other machines, can be said to be four tools in one; not that it is possible to use it for more than one purpose at a time but in the present method of building roads a roller is only

used a small portion of the time, so it is economical to adapt it to as many uses as possible. In this manner the cost of plant, or rather the investment in plant can be maintained at the minimum.

In like manner, wagons, which are an important factor in road building, should be of the most improved type, and adapted as far as possible to all kinds of hauling. So, too, with concrete mixers. Some contracts demand a hot mixer as well as one for mixing ordinary concrete. Money is saved when one mixer will answer for both purposes.

Another item in the cost of plant is in the character of the plant purchased. Cheap and poorly made plant means money lost to the contractor in several ways. Delays occur through breakdowns and these are always expensive. Cheaply made tools mean continual repairs and a short life, and are an added expense to any job. Only well made tools should be used. A guarantee as to the construction of a machine can and does mean little. It does not mean payment for delays caused by breakdowns, nor for poor work being done. The ability of a manufacturer for swearing his product is a good one is not a help to a contractor or engineer in getting his work done, nor in showing that the machine in question is well built. The greatest asset is in buying from a firm of recognized responsibility, one of integrity, and one that is so well advertised that they must stand behind their products by putting into them only the best of materials and workmanship. This is the best guarantee possible. This means work done at low cost. A firm with such a reputation means that thousands of dollars have been spent by them and their customers in obtaining these results. The new customer profits from these past expenditures.

These are all possible factors in plant and equipment, upkeep and maintenance cost. The problem that the contractor and construction engineer must solve in this connection is a very difficult one, owing to the many adverse conditions.

Road work is done in comparatively short stretches, usually in a single season, which varies in length from about one hundred, to one hundred and eighty days, according to the climatic conditions. A contractor's plant is moved onto a job, and is used along the line of the work, part or all of the time during the season. Much of a contractor's plant is made up of transportation machinery, and even other items of plant are only working in one place for a few days at a time, so that to protect plant while at work on such jobs is very difficult, and in many cases any kind of a protection is a detriment, and a great hindrance to the free movement of the men and teams.

All machinery should be protected when it is not being used, and some when in use. Boilers at work, use much more fuel when not protected. Some kind of a house, built in sections should always be used to protect boilers. Such sheds can have one side left out, and a canvas curtain used when necessary. If the sides and tops are built in sections they can be hooked together with hooks and rods and staples so as to be rigid enough to stand up against the wind and weather.

Machinery that cannot be protected while at work, can be covered with canvas coverings over night, during rainy spells and at such times when they are not in use. Every traction engine and roller should be thus pro-

tected. Steam drills and such tools can be covered with a canvas jacket. The machinery part of a concrete mixer can be so protected, and also pumps and other equipment. Heavy water-proofed canvas will be found to be excellent for this purpose, and not only keep the machinery clean from dust and mud, but will likewise prolong the life of the equipment. As the canvas becomes worn from use, it must be re-treated with water-proofing liquids to preserve it.

At the end of the season, with the job finished, the question always arises, "What shall be done with the plant?" To move it from its present place to some central storage point, will mean an added expense to get it onto a new job. If the work on the same road is to be continued the next season the entire outfit may have to be moved back. The plant can be moved to the next job at the minimum cost from the site upon which it last worked. Then the question comes as to how repairs should be made, and the protection to be given the plant from the winter weather.

Situated away from machine shops, the proper overhauling cannot be given to all the plant, but it will be possible to replace many of the worn and broken parts with new ones, tighten up all loose keys and nuts, and do all repairing that can be done in the open. Then all iron and wood work can be painted. This is a protection not only against the weather, prolonging the life of the plant, but also a business proposition that pays well, as every one is impressed with machinery that looks well, and paint covers a multitude of defects.

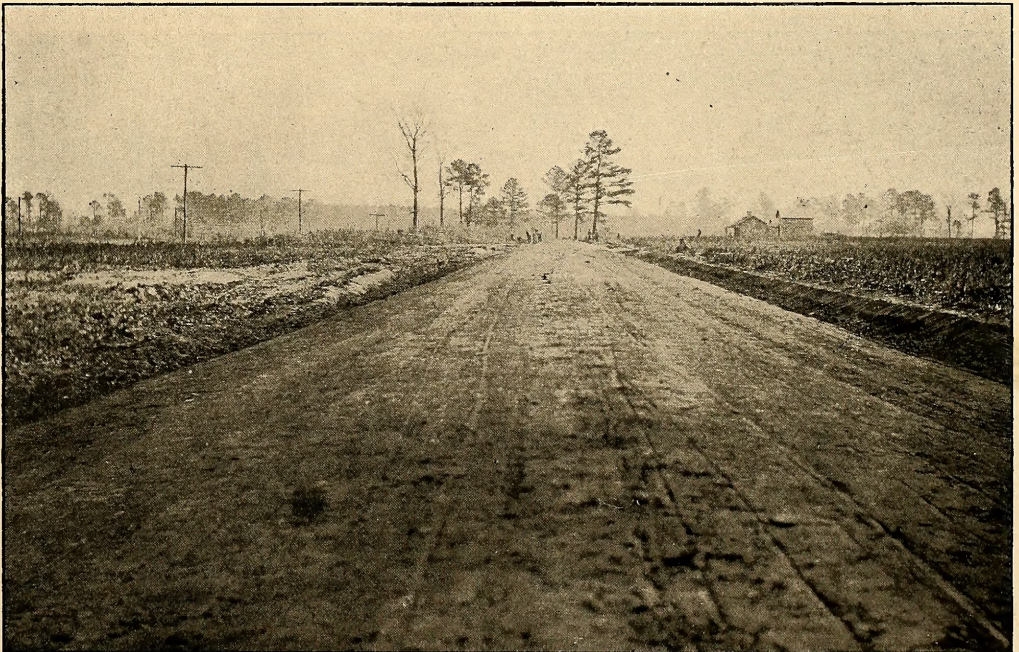
In some localities it is possible to obtain an empty warehouse or barn in which the various machines can be stored while they are idle, or during the winter season. This keeps them entirely out of the weather, and

also allows of repairs being made under cover, which means not only quicker, but also cheaper work.

For winter storage it is also possible to group a number of machines together, and build over and around them a temporary shelter made of cheap boards and single ply tar paper, which will last during a winter season. By using the tar paper, the boards can be spread six inches or more apart, both on the sides and roof. Around this temporary shed a ditch should be dug so as to prevent surface water from getting to the machines.

If it is not possible to protect the machines by any of these methods, then the canvas coverings can be resorted to, with fairly good results. These covers should, as far as possible, be shaped to the machine upon which they are to be used. Good and substantial brass eyelets should be fastened in the well bound edges, so that the coverings can be tied tightly to or under the machines, otherwise the wind will flap them loose, soon beating the covering into shreds, as a flag is worn out by the wind, and thus exposing the machine to the weather. Canvas coverings made to fit any machine will always be found useful in protecting machines over night or when not in use for a few days.

Whenever machines are not stored for the winter in buildings, they should be stripped of their brass and glass parts, otherwise these fixtures will be broken or stolen, which means a serious loss. The parts from each machine should be placed in separate box, nailed up and properly labeled, the box being stored away for safe keeping. If the machines are stored in a building, it is not necessary to take off part, as if any one breaks into the building they must go to the trouble of taking off the brass, while if the parts are stored in boxes, the



AFTER IMPROVEMENT

This Picture Shows the Same Road, After Improvement, in Edgecombe County, N. C., Transformed Into an Object Lesson Sand Clay Road, Under the Supervision of Mr. Hathaway

rascals take box and all, giving them much less trouble, and thus assisting them in making a clean sweep of all the brass fixtures.

When a new machine is purchased, there should always be bought at the same time a number of spare parts, which should be kept on hand to be used as needed. No man can build a machine that will not break down in some vital part sooner or later. A breakdown in a construction job means not only a delay, but a waste of money, for even if men can be laid off and not paid, or can be given other work, yet the job, due to the changes made necessary by the breakdown, will not be worked in the most economical manner. It is true that many contractors do keep some spare parts, but they seldom have on hand enough, or the proper ones, due to the fact that as the parts are used to replace broken ones, new ones are not ordered from the factory. Then either one of two things occurs: the job is shut down or some part of it, or the machine is worked with the broken part until a new one can be ordered and put in place. This means that the machine is racked by the work it does, doing permanent injury to it.

A good blacksmith shop on the job, equipped with forge for heating heavy steel and with stocks and dies for bolts and pipe, and with good drills and vises, will be found to be a great assistance in the upkeep of road equipment. For heavy machines a few roller bearing or small hydraulic jacks will be found useful in making repairs and renewals.

Small tools can be repaired promptly in a blacksmith shop. Attention should be given to these as well as to the larger machines. To prevent such tools being lost, they should not only be branded with a die of the contractor's name or initials, but they should likewise be painted with a set of colors, selected by the contractor,

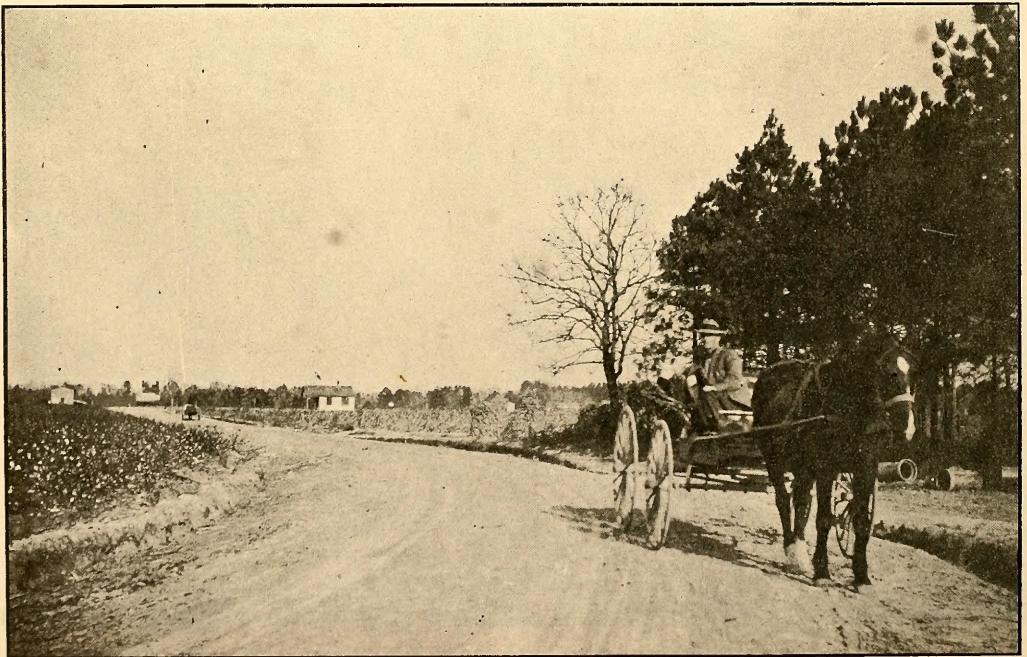
to designate his equipment and advertise his business. These colors can be used on the head of some tools, and in most cases on the handles. Tools can thus be seen at some distance, and thus prevent their being stolen or lost. All bright parts of tools and machines that can't be painted should be well greased so as to prevent rusting.

Many of these suggestions seem useless, or more or less self evident, but any one who has much to do with road construction knows that tools and machines are scattered along the entire line of a piece of new road construction, just where they were last used, and they stay, neglected, until they are needed again. Then they are found out of order, and to repair them, frequently new parts must be ordered, some days intervening before such parts arrive. The tool or machine depreciates greatly in value by such treatment, and thus contractors are compelled to figure a heavy plant expense item against every job. The cost of caring for this equipment is much less than the depreciation figured against it from neglect.

Such extra costs means higher prices for road work, and as there are many thousand miles of roads that need improving, every dollar wasted means less mileage built each year. Both engineers and contractors are interested in obtaining good roads, and they should do everything possible to save money in the construction of roads.

The city of Baltimore, Maryland, has paved during the past two years fifty miles of its streets at a cost of \$2,000,000. It is planned to expend about \$8,000,000 more on the system.

Moultrie, Georgia, votes this month on a bond issue of \$60,000 for street improvement.



Another View of the U. S. Object Lesson Sand Clay Road in Edgecombe County, North Carolina. Messrs. E. O. Hathaway and T. P. Jenkins Inspecting the Road

The Annual Convention of American Road Builders' Association

By DR. JOSEPH HYDE PRATT

PERHAPS the best and most enthusiastic road convention ever held in the United States was the one carried out under the auspices of the American Road Builders Association in Philadelphia from December 9th to 12th. The convention excelled particularly in the excellence of its programme, and this fact was peculiarly emphasized by the crowded hall in which its sessions were held and the close attention that the delegates paid to the papers that were read and discussed. The exhibits were very extensive and were shown in the Armory and also in a large tent a short distance away. Every foot of space in the Armory available for exhibit purposes was utilized. This feature of the convention was appreciated by the delegates and visitors who spent all the spare time possible in examining road machinery, surfacing materials, and discussing road questions with those in charge of the exhibits.

There were fully 2500 people in attendance, and there was probably no convention where as many Road Engineers, Highway Commissioners, and Road Superintendents have been brought together; and their presentation of papers on various technical subjects were ably discussed not only by them but by contractors and other road builders. The subjects discussed were as follows:

1. Highway officials, their duties and powers.
2. Division of expense, responsibility and authority between nation, state, county and town.
3. Relation to each other of the contractor, engineer and inspector.
4. Details of arrangements for the use of convict labor.
5. Determination of the amount of realignment, grading and drainage to be done in connection with road improvement.
6. Factors covering a proper selection of road or street pavement.
7. Short papers on details of the construction of various kinds of roads and pavements.
8. Unit price and lump sum contracts and percent-age work.
9. Testing of materials for road and street construction.
10. Sub-organization for securing sufficient maintenance.
11. General methods of repairs and renewals.
12. Bituminous surface treatment and dust prevention.

All of the above subjects were very thoroughly discussed and some extremely good road literature has been obtained as a result. Many of these papers will be published in full in this magazine.

On Thursday night a public meeting was held in the auditorium of the Hotel Bellevue-Stratford, which was attended by at least 600 delegates, who were addressed by Mayor Rudolph Blankenburg of Philadelphia, Robert P. Hooper of Philadelphia, Hon. D. F. Shackelford, member of Congress of Missouri and Hon. Samuel Hill, President of the American Road Builders Association. Mr. Hill gave a very interesting illustrated talk on the roads of Europe and America.

The annual banquet of this association was held Fri-

day night at the Hotel Bellevue-Stratford, and this closed a most successful and instructive road convention.

This convention passed a resolution urging the appointment of a committee to consider the advisability and practicability of holding but one American Good Roads Congress. This was the opinion of the exhibitors who signed a paper urging and demanding that such action be taken. The full text of the resolutions are given below:

RESOLUTIONS.

Whereas, it is the expressed purpose of the American Road Builders' Association to acquire and disseminate information and to stimulate interest and to promote legislation and other measures in the interest of the building and maintaining of highways; and

Whereas, it is increasingly evident that this work can best be accomplished by complete co-operation or amalgamation with other associations working for the same broad purposes, and

Whereas, the federal congress will in the near future take some action leading to the participation in the building of roads by the government and in order that such legislation as is enacted be fair, just and equitable and that the monies that are appropriated should be spent without undue influence of politicians, it is advisable that the road organization should present a united point of view to congress.

Now, therefore, be it resolved; that it is the sense of this association that an earnest effort should be made for a complete understanding with such other national road associations as have similar ideas and for this purpose the president of the American Road Builders' Association be and hereby is authorized to appoint a committee of three, of which the president shall be a member and chairman, with full powers to act and to meet with similar committees from other road associations and consider, and if possible perfect, a complete amalgamation.

Resolved, further that we herewith petition the congress of the United States to authorize the president to appoint a commission from civil life and make a sufficient appropriation to said commission to enable it to make a thorough investigation of the whole question of federal appropriations for road construction and that this commission shall report its findings to the president.

Whereas, there has been held during the past year several national road conventions on elaborate scales, necessitating great expense on the part of delegates and exhibitors, therefore be it

Resolved, that it is the opinion of this convention that all National Road organizations holding or intending to hold such conventions should unite and next year, and succeeding years, hold but one annual road congress. And we would suggest that said congress be held during the month of March.

Whereas, the rooms assigned for holding the sessions of road congress in recent years were wholly unsuited for the purpose, resulting in great annoyance to the delegates, thus reducing the value of the congresses, therefore be it

Resolved, that there should be provided in the fu-

ture halls suitable for holding the sessions of the congresses, far enough removed from the exhibits to be free from confusion and noise.

Resolved, that the sincere thanks of this convention be extended to the governor of the state, the Mayor

and Citizens Committee of this city for their cordial welcome, and the many courtesies they have extended to us; and to the press of the city for the splendid and extensive manner in which they have reported this convention.

The Road Problems of Tennessee

By GOVERNOR BEN W. HOOPER

THERE is an evident desire among the people of the state to improve the public highways. This sentiment has resulted in the last few years in the issuance of county road bonds aggregating several million dollars, and in the construction of good systems of graded and metalled roads in many counties. It has resulted in the building of the greater part of the Bristol-to-Memphis Highway and the hope of the completion of this trans-state road within the next few years.

There has been but little genuine road improvement

ly, for a state highway department and state aid to road building. In every legislature in recent years bills have been offered upon this subject. As a rule, they have been crude, ill-considered, poorly adapted to the needs of the people and out of joint with other existing laws.

For the education of the people, for the acquirement of information useful to the next general assembly, for the procurement of proper legislation, for the prevention of ill-advised, expensive and injurious enactments, and for the consequent advancement of the cause of highway construction and improvement in the state, I have decided to appoint a commission to study, investigate and report upon every phase of this question.

There are many related questions involved in the consideration of this problem, and it is necessary for them to be considered together. It will not be inappropriate for me to suggest here some of the most important questions that arise in connection with the subject of road legislation.

In the first place, shall the state extend aid to counties and districts in the construction of public highways?

If it be assumed that the theory of state aid is correct, then the next question is: in what way shall the state extend such aid?

The state can participate in road building by one of two methods, or by both of them, namely, by the direct expenditure of real money or by the use of state convicts.

If the state is to contribute funds, how shall they be realized? There are only two methods, direct taxation and bonds.

If the money is to be raised by direct taxation in any adequate amount, either the present levy must be increased or some of the present expenditures of the state must be diminished.

If it is considered improbable that the increase of the tax levy would be approved by the legislature, it will then become necessary to point out specifically wherein other expenditures can and will be sufficiently decreased to leave anything substantial for road building.

It has recently been suggested that the state issue bonds in the amount of \$15,000,000, not all at one time, however, for aiding in the construction of public highways. In view of the state's present bonded indebtedness, it is a matter of grave doubt whether the people would be willing to increase the state's bonded debt for a good many years to come. This proposition will, however, be agitated.

If it should be found that the state could not at this time contribute any substantial assistance to the construction of roads, would it then be desirable to create a State Highway Department merely for ornamental and educational purposes, or would it be preferable to leave the educational work to the federal government, as at present, and the ornamental functions to the numerous oratorical candidates and politicians who



GOVERNOR HOOPER

in the last twenty years under the general road law of the state. Of late years it has become customary to secure the enactment of special road laws applicable to only one county, but in most instances these are only slight modifications of the general law.

In the meantime there has been a continual agitation for the enactment of additional general legislation for the improvement of the public highways and, especial-

have discovered that the road movement is somewhat popular?

In case financial aid should be given by the state, another question will present itself. In the distribution of state aid shall the progressive counties that have already bonded themselves and built county roads receive credit for what they have so expended?

In dealing with the question of using state convicts to build public roads, several highly important considerations must be weighed. Among them may be mentioned the following:

The paramount consideration is what is best for the convicts and not what is best for the roads. It may be added that whatever is best for the convicts will result in the greatest good to the people at large. The good-roads enthusiast naturally desires to work convicts on the roads, but such a system should be adopted only after the most careful study of the matter from the standpoint of the convict.

The next consideration is whether or not roads can be economically built by convict labor. There is a conflict of testimony on this subject.

Another problem lies in deciding what are the rela-

term convicts, for example, those given a term of not more than three years, to the county jail. This would permit each county to retain and work its own short term men. In connection with this proposition, it would be well to ascertain about what percentage of the smaller counties would not have a sufficient number of convicts in any event to work profitably and would therefore be burdened with the cost of what few they might have left with them for such increased terms.

Much thought should also be given to the enactment of an improved general road law for the counties of the state.

A merely casual glance at the variety of important and difficult elements embraced in the preparation of sensible and appropriate road legislation serves to convince that this is a matter that cannot be disposed of on the hustings or in the crowded session of a legislature.

In order that no phase of this question may be left out of account, I have appointed on the commission engineers, contractors, business men, progressive road men, financial officers of the state, prison officials, students of penology, organized labor men, lawyers and farmers.

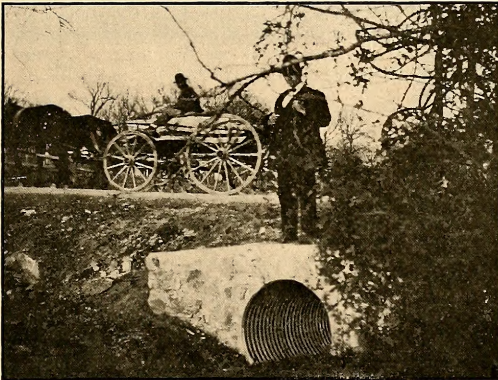
I most earnestly urge upon each of them that, as a labor of practical patriotism, he gather all the information possible upon the subject herein discussed and all its branches. It is not my intention to call this commission together at an early date, but I will call upon them for data and information which I will file and digest.

A little later, I expect to make a trip to Georgia with as many of the commission as will accompany me to observe the workings of the convict and road system of that state. I have been planning for several months to do this, and the governor of Georgia has very kindly insisted upon my doing so.

The members of the Tennessee Highway Commission, appointed and commissioned as hereinbefore stated are as follows: Cyrus Kehr, Knoxville; W. F. Carter, Johnson City; W. J. Oliver, Knoxville; George L. Hardwick, Cleveland; Gen. John T. Wilder, Monterey; Ben D. Jones, Sweetwater; Lee F. Miller, Elizabethton; John A. Denton, Dayton; J. K. P. Wallace, Clinton; Newell Sanders, Chattanooga; C. C. Menzler, Chattanooga; Webster T. James, Chattanooga; Louis J. Bernhardt, Chattanooga; Horace A. Mann, Knoxville; Roe Monday, Knoxville; J. M. Taylor, Cave; James S. Beasley, Nashville; John P. Denton, Franklin; George P. Woollen, Nashville; W. P. Hickerson, Nashville; M. Richardson, Lawrenceburg; W. B. Romine, Pulaski; Frank Maloney, Nashville; Abe Davidson, Tullahoma; S. G. Marshall, Nashville; F. N. Smith, Clarksville; Robert Gallagher, Shelbyville; Albert E. Hill, Nashville; Jere Whitson, Cookeville; Henry Head, Union City; Wilson Enoch, Huntingdon; W. K. Abernathy, Selmer; W. F. Appleby, Lexington; A. M. Patterson, Savannah; J. W. Lewis, Linden; P. W. Miller, Decaturville; John R. Rison, Paris; Roger German, Alamo; J. R. Reeves, Bolivar; Sid P. Clark, Trenton; John W. Farley, Memphis; T. B. King, Memphis; A. I. Dorsey, Ripley; W. H. Ward, Dyersburg.

Fort Myers, Florida, has available for street work \$47,000. They will build 7½ miles of high grade streets with this amount.

Precincts No. 1 and No. 2 of Reeves county, Texas, vote on the 24th instant on a bond issue of \$100,000 for roads.



One of Harry Brothers 36-inch Metal Culverts on the Central Highway in Orange County, North Carolina. Mr. Smyth Campbell, Assistant Highway Engineer of Orange County, Standing Over the Culvert

tive merits of working convicts on the roads and working them where they are now employed by the state. There is much to be said upon many phases of this question.

If it be found desirable at the termination of the present contracts with the lessees inside the main prison to divert all or a part of the convicts used by said lessees into some other line of employment, it must be ascertained to what extent they can be used on the large prison farm to which 2,312 acres have recently been added.

If it be suggested that the state should discontinue the use of the convicts in the state's coal mines, several important financial questions will arise; among them, to what extent does the employment of convicts in the mines unfairly compete with free labor, and what losses would the state suffer by putting the convicts into less remunerative work and undertaking to abandon and sell its mining properties both at Petros and the Herbert Domain.

As a substitute for having the state convicts on the public roads or furnish them to the counties for that purpose, it has been suggested that the criminal laws be so amended as to provide for the sentencing of short-

The Use of Explosives in Road Building

As might be expected, the National Highways Association has rather advanced ideas as to the importance of good roads. They even go so far as to definitely associate prosperity and education with good roads and to ascribe poverty, ignorance and the high cost of living to poor ones. The illustrations shown herewith with the association's own captions under them show



Why Living is Costly

very clearly their views on this subject.

Road building nowadays is a much simpler problem than it was in the earlier days of our history. This is due largely to the introduction of explosives in the work. Before explosives were invented, quick lime was the road builder's best aid. The subjugation of hard rock was a very slow process with quick lime. Later came gun powder which materially facilitated the building and extension of highways. This was followed by the modern high explosives. Dynamite now makes possible the building of highways through mountainous regions and what appeared, in the old days, to be unsurmountable barriers are now quickly and comparatively easily overcome. For driving tunnels, building roadways on rocky cliffs, clearing right of way over which highways are built and for the proper drainage of roadways, dynamite has no equal.

Since the introduction of electrical blasting, it is possible to lift out long sections of solid rock at a single blast, leaving the road almost in a finished condition with the exception of the little smoothing and levelling which takes comparatively little time.

Were it not for explosives, it is safe to say there would not be in the United States today one-tenth of the mileage of good roads that now exist.

Civil engineers regularly use dynamite in building highways but many county road supervisors, road commissioners and farmers responsible for the condition of roads adjacent to their farms still depend upon their horses and their own brawn together with such simple devices as sledges and cold chisels for their road build-

ing and repairing operations. However, it is a good sign of our civilization that more of these men are learning daily that dynamite affords the quickest, cheapest and best way to move dirt, shale, or rock in large quantities.

Since the introduction of insensitive grades of dynamite which are relatively safe to handle and use, there is not the fear of high explosives existing in the minds of men not regular users of dynamite that existed some years ago. There was a time when miners and contractors were practically the only users of dynamite. The notion prevailed in some minds and still prevails today in some quarters that a piece of dynamite, if merely dropped on the ground, would explode and annihilate everything within a radius of 50 feet. Most ordinary citizens have become educated to the fallacy of such notions. There is little more danger in dropping a stick of dynamite on the ground than in dropping a gunner's powder flask or his box of shells.

It is now becoming a rather common thing to see small dynamite magazines located in out of the way places on farms. The explosive is now very generally used for lowering grades of old, hard roads, for cutting hillsides to straighten roads, for digging channels and gutters, for straightening or deepening creek channels, for drying up mud holes, for preparing boulders and rock for stone crushers, for excavating bridge or culvert crosscuts, for planting shade trees along highways and for rejuvenating shade trees which have been planted for several years and which are not making satisfactory growth because of



How to Reduce It

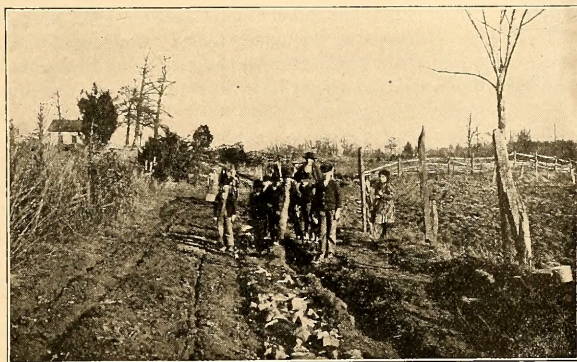
dense soils or lack of moisture.

The American Highway Association and Federal Aid.

What the American Highway Association, the central organization working with state associations in all the states, stands for in relation to federal aid in the improvement of highways, was explained by J. E. Pennybacker, secretary of the association, when invited to

appear before the Good Roads committee of the House of Representatives.

Speaking for the two thousand members of the American Highway Association, Mr. Pennybacker stated that the association stood for a co-operative plan rather than the extreme of either centralization or localization, and that the roads carrying the heaviest rural



Poor Roads—Poverty—Ignorance

traffic should be the first to be improved by federal aid.

When he had finished his formal statement, Mr. Pennybacker was requested by members of the committee to outline his personal views. As editor of the good roads year book and as special expert of both the federal government and of the Canadian government, Mr. Pennybacker is regarded as one of the foremost authorities on the subject of roads, and he said frankly that he believed that a distribution of government funds on a "pork barrel" basis would do great harm. To avoid the suspicion of this, he said, the state should be taken as the smallest unit for federal aid. The government will then have to deal with only forty eight parties; where, if it gives federal aid to townships, it would have to deal with 29,000 townships or districts. He believes in co-operative plan, rather than the direct distribution of funds.

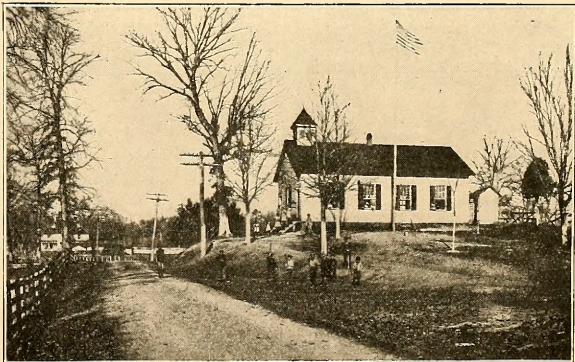
By dealing with the states, and requiring them to contribute, the pressure upon congressman by constituents will be avoided, Mr. Pennybacker asserted. The townships would have to deal with their own State Highway Department whose officials are familiar with local conditions, the state authorities to make the first selection of roads to be improved, with the government inspecting and holding veto power and sharing cost of improvement. He advocated a sliding scale based on taxable valuation per square mile whereby the state's outlay would be proportioned to its ability to pay, as shown by tax returns, while the government's outlay would remain fixed in accordance with the factors of population, area, and miles of post roads. He urged that the government funds be used for both construction and maintenance so as to conserve the large mileage of roads already improved and meet the needs of those states which are going ahead with construction.

In closing, Mr. Pennybacker made a suggestion which may solve the big problem as to whether the federal

government should spend its money on trunk lines or the roads leading from farm to market. This is the question over which the farmer and automobilist usually contend. Mr. Pennybacker said that instead of adopting a definite policy, the question in each case should be determined according to the needs of the state. In Maine, he pointed out, it might be to the advantage of all the citizens, including farmers, to have the trunk lines improved, because of the great number of tourists and summer visitors. In Iowa, on the other hand, it would seem wise to improve the market roads, because the chief need is to make good roads so that the farmers can get their products to market. He suggested therefore that this question be left as an administrative detail to be worked out by the representatives of the federal government and the respective states. Members of the committee were impressed by the argument and it may prove the solution of the question over which congress has been hesitating for years. Automobile and farming interests intimated that they might get together on this compromise plan, which seems in line with practical progress, and if such a union can be effected, one of the greatest hindrances of the federal aid movement will have been done away with.

Before the National Roads Committee.

The number of good roads bills that have been introduced in congress is astonishing. The new house committee on public roads has been literally swamped with them for the past month and the end is not yet in sight. Half of December was devoted by this committee to hearings on the various bills submitted and rep-

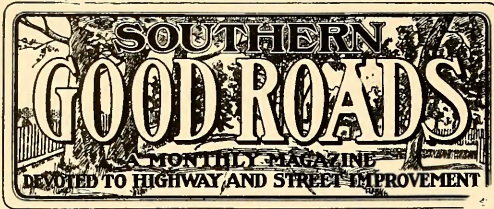


Good Roads—Prosperity—Education

representatives of good roads organizations all over the country appeared before the committee.

The organized motorists of the nation, represented by President John A. Wilson, Chairman Diehl, of the Good Roads Board, and Chairman Batchelder, of the Executive Board, of the A. A. A., got their case before the committee December 16.

The character of the many bills introduced attest the nation-wide interest in the subject and it is believed that the national government will soon hit upon some plan for helping to forward the movement for highways.



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1914.

Southern Good Roads enters the new year and Volume 9 of its existence with this issue and extends to its faithful army of readers throughout the South, the season's greetings. It is our sincere desire that every member of our big family may have a successful year and that we may be able to do more for the furtherance of the good roads movement in 1914 and for the general uplift and betterment of the South, than in the year that is gone.

In many ways 1913 was a remarkable year. Despite the handicap of tariff and currency legislation, which always upsets things, wonderful progress has been made by every Southern state and when the figures are all totalled up it will be shown that there has been great progress in road-building during the year, as well as in all other lines.

The South is prosperous. Everything is looking up. No other part of the country is in as good shape as the south and, viewing the situation from every vantage point, we can see no place for the knocker, the demagogue or the calamity-howler to get in his dirty work. We confidently expect 1914 to be the biggest year in

all of the South's history, commercially, industrially and agriculturally.

Interest in good roads continues to grow and the movement will feel the effect of the South's prosperity. More miles of good road will be built in 1914 and larger sums will be set aside for the work, than in any other year in the history of the nation. This is not just idle "boosting." Our prediction is based on what we know of conditions in the South today. Good roads advocates never worked under conditions as favorable as those which confront them in 1914, and big things are going to happen.

It will doubtless bring pleasure to the majority of our readers to learn that we have prospered during the past year. During 1913 our circulation and advertising patronage reached their high water mark and our prospects were never so bright. The magazine is upon a solid foundation and looks forward with pleasure to the career of usefulness and service that lies ahead of it.

A happy New Year and a prosperous one, to every one of you.

AMALGAMATION.

The amalgamation of all of the national good roads associations suggested by the exhibitors at the recent convention of the American Road Builders' Association held in Philadelphia, would be a wise thing. The present system works a big hardship on the exhibitors of road machinery and materials and it fails of the best results because of the lack of the get-together spirit that it entails.

It stands to reason that one big, powerful organization, embracing in its membership all of the good roads enthusiasts now working with the various national associations, would be a far more effective agency for good than four or five organizations, often at cross purposes, working along different lines and disagreeing as to methods and measures.

As we suggested recently, the failure of the advocates of federal aid to get results, has been due, not to lack of enthusiasm, but to lack of co-operation among those who favor it. There are almost as many plans for federal aid as there are advocates of it and a great national association, embracing all of the present organizations, fighting for one definite plan—worked out by a wise commission—would get results.

The American Road Builders Association declared in favor of the plan and the amalgamation of these associations may be accomplished in 1914.

GROWTH OF CONVICT LABOR IDEA.

We believe that all able-bodied convicts should be employed in building public roads. Southern Good Roads from its very first issue, has sought to convert the people of the southern states to this belief and it is pleasing to note that the idea is gaining ground everywhere.

In this issue Governor Ben Hooper, of Tennessee, has

a very fine, thoughtful, common-sense article on the road situation in Tennessee, in which he suggests a careful investigation of the merits of the plan. His commission, composed of loyal Tennesseans, of recognized ability, will take the matter under consideration and a plan will be worked out that will be best for Tennessee. We confidently expect this commission to devise some way of putting the convicts of that state on the public roads.

Kentucky has just passed a constitutional amendment permitting the use of convicts on the public highways. Previous to this all of Kentucky's convicts have been employed within prison walls, under the old contract system. The state prison officials, mindful of the fact that passage of the amendment was imminent, refused to renew the contract system for a term of years, and as a result, all of the convicts are now ready to get busy on the roads just as soon as legislation can be drafted to put them there. Work on drafting the needed legislation is now going forward rapidly.

The movement is gaining ground in all parts of the county, in the north as well as in the south, and we look for great things along this line in 1914.

AN INTERESTING EXPERIMENT.

In order to determine the durability of cement and vitrified brick pavements, an experiment was conducted during the sessions of the American Road Congress at Detroit, Michigan, from September 29th to October 3rd, 1913, inclusive, that demonstrated pretty forcibly the wearing value of these surfaces. A circular area having a diameter of 25 feet was paved as follows:

One segment was paved with concrete by R. D. Baker Company, the material consisting of one part cement, one and one-half parts washed sand, and three parts crushed rock of $\frac{1}{4}$ to $1\frac{1}{2}$ ". Another segment was built by the Wayne County Highway Commission of material containing one part cement, one and one-half parts washed sand and three parts washed gravel, 7" thick. A third segment was also built by the Wayne County Highway Commission, the material consisting of one part cement, one and one-half parts washed sand, and three parts screened washed gravel, 7" thick. The fourth segment was built by the Detroit Vitrified Brick Co. of Champion brick. On one half of this segment the brick were laid on a sand cushion one and one-half inches thick according to standard specifications. On the other half of this segment, the brick were laid on a bed of mortar.

The concrete was laid five weeks before the test.

The wearing value of these surfaces was tested by means of four cast-iron rollers weighing 1500 to 1600 pounds each, attached to a movable shaft 24 feet long, two rollers being on each end. Attached to the inner side of the rollers were five shoes which came in contact with the cement and vitrified brick surfaces similarly as shoes, on a horse, and with a pressure of 75 pounds. As the rollers revolved around this circle, the shaft moved horizontally; so that in 360 revolutions, the rollers moved from one side of the pavement to the other. In this way practically all portions of the area tested received the same amount of wear. At the end of the experiment on Saturday October 3rd, it was noted that the surface that showed the least wear was the vitrified brick laid upon the mortar bed. These bricks

were apparently not loosened at all, were not broken, and had worn very evenly. The surface that showed the next least wear was the cement surface made of the fragments of granite. This surface had worn considerably and had some depressions made in it.

The vitrified brick laid upon the sand cushion were badly loosened; many of them broken, and many badly worn. The wearing was not at all even.

The concrete made out of the gravel was very badly worn, and depressions of considerable size were made.

From the above experiment, it would seem that angular fragments of stone will make a better concrete road than smooth round pebbles.

Another interesting point that apparently is brought out by this experiment is that vitrified brick laid on a mortar bed will stand traffic better than those laid on a sand cushion. Nearly all engineers have advocated the sand cushion, claiming that it was necessary to have this or else the brick would break and go to pieces under traffic. Several, as Mr. William Bayley of Springfield, Ohio, and the writer, had advanced the theory that the sand cushion was not only unnecessary but was a detriment to the best results from a brick pavement, and have advocated the brick being laid on a mortar bed.—Dr. Jos. Hyde Pratt.

The Highway Engineering department of Columbia University, of which Prof. A. H. Blanchard is the head, extends through Southern Good Roads an invitation to all highway officials, engineers, chemists, contractors, engineer-salesmen and all others interested in any subject in highway engineering to make use of the Davis Library of Highway Engineering for current reading, research work, consultation of current trade catalogs, price lists, specifications and technical periodicals.

The Davis Library of Highway Engineering, located in Rooms 407 and 410 of the Engineering Building, is the most complete collection of works on highway engineering and allied subjects in this country. All the most recent books in English, French and German have been purchased and in addition many old volumes which are of interest from a historic point of view have been secured. Town, municipal, county, park, state and government reports and specifications, many monographs and complete files of trade publications also form an important part of this library. All technical periodicals which contain articles relative to highway engineering and allied subjects are on file, hence the latest literature in the science and art of highway engineering is available.

The Davis library is open throughout the year from 9:00 a. m. to 5:00 p. m. on all week days except Saturdays and holidays, and on Saturdays from 9:00 a. m. to 12:00 M. From December 1st to April 1st it is also open on all week days except Saturdays and holidays from 7:30 to 10:30 p. m. and on Saturdays from 2:00 to 6:00 p. m.

This library was founded through the efforts of Mr. Charles Henry Davis, President, National Highways Association, in connection with the graduate course in highway engineering.

Sauretown township, Stokes county, North Carolina, has contracted for 15 miles of model sand clay road. Danbury and Meadows townships have also contracted for a great deal of sand clay construction and work is being pushed rapidly in all three of the townships.

Paseox county, Florida, has appropriated \$65,000 to build 40 miles of sand clay roads.

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Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

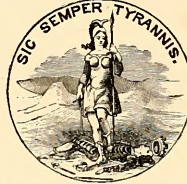
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Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

C. L. SCOTT, JR., Secretary

ARTICLE III. CONSTITUTION
MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

Virginia Road Builders' Association Feb. 10-11.

The annual convention of the Virginia Road Builders' Association is to be held in the city of Richmond on February 10th and 11th, in the auditorium of the Murphy Hotel.

This association is the leading road organization in the state and embraces in its membership the best highway engineers, the most progressive county road officials, and the leading road-builders of the state. It has the unqualified endorsement of the highway commission of Virginia and of all the state officials.

County officials, engineers, contractors and persons interested in road building, are invited to attend this meeting. There will be instructive and inspiring addresses by leaders in the good roads movement in Virginia and elsewhere.

It would pay every county in the state to send a representative to this convention and pay all of his expenses. There will be something worth while for the practical road-builder every minute of the convention and the new ideas a wide-awake road official would gain at this gathering, would be worth a great deal more to his county than it would cost.

For further information address C. L. Scott, secretary Virginia Road Builders Association, Waynesboro, Va.

* * *

Commissioner Wilson's Report.

Hon. P. St. Julien Wilson, state highway commissioner of Virginia, has submitted his annual report, which shows, among other things, that 619.33 miles of highway were built in Virginia in 1913. He foresees even greater activity in 1914 and asks for \$1,306,000 to continue the work.

It is interesting to note that since the appointment of Captain Wilson in 1906 Virginia has built 2,000 miles of modern roads. This work has been done with the state convicts and with funds set aside by the state for the work of road-building and is independent of the work done in those counties which have bond issues for road-building.

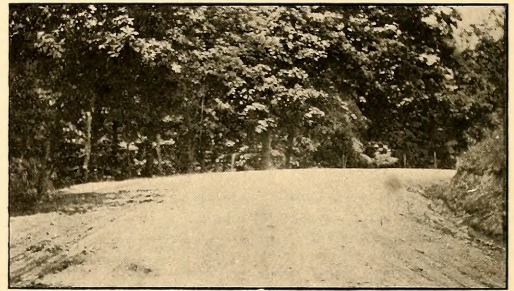
Since the beginning of his tenure of office Captain Wilson has witnessed the expenditure of \$6,324,000 raised by bond issues and other methods in 32 counties of the state. The total amount raised by bond issues in 1913 was \$1,206,000 in 13 counties.

Mr. Wilson is an ardent advocate of convict labor in road construction. It has been his experience that in no other way can roads be built so cheaply and he recommends the working of all of the state convicts on the roads and all county convicts now confined in jails

throughout the state. He has found from experience that men worked on the roads are a great deal happier and far more healthy than those worked in factories or at the state prison.

He recommends that the special license taxes collected from automobilists go into a fund for the upkeep of roads and that it be used for no other purpose.

There are now in the various state camps of the Vir-



Section of the Beautiful Yanceyville Road in Pittsylvania County, Virginia

ginia Highway Commission, about 1500 convicts able to do full road duty. Of these about 1,000 are from the state prison and the remainder from county jails.

The number of miles of road constructed under state supervision since 1907 are as follows: 1907, 24 miles; 1908, 51.80 miles; 1909, 137.58 miles; 1910, 290.07 miles; 1911, 395.86 miles; 1912, 542.63 miles; 1913, 619.33 miles.

Richmond-Norfolk Highway.

The Tidewater Automobile Association had a combination dinner and business meeting at Norfolk in December and launched the Richmond-Norfolk Highway proposition. They accomplished a good deal in getting the matter well started.

One of the speakers deplored the fact that there has been too little "pull together" between the two greatest of the Virginia cities. With a touch of humor and not a little sarcasm, he gave some causes for the failure of these two good cities to work in harmony. There may have been a great deal of truth in what he said about lack of harmony, but be all of that as it may, the time is passed when Norfolk and Richmond should antagonize each other. As the speaker referred to suggested the two cities are in Virginia, and they are

both close to North Carolina, and instead of pulling apart, they should get together to build up themselves and the two great states, of which they are a part, so to speak, and in helping to build up the two fine commonwealths they will be building up themselves and making the two cities the pride and the joy of all the Southland.

Under any circumstances the highway will be costly; there are two available routes, either of which would strike Petersburg, from which point to Richmond there is now being built a permanent road. In other words the Richmond-Petersburg highway is an accomplished fact. One of the proposed routes cuts around Southampton county and touching the good towns of Franklin, Courtland and Boykins, and the other frisking through an edge of Southampton and the centre of Sussex county and touching the towns of Ivor, Wakefield and Waverly, to say nothing of Disputanta and two or three villages intervening.

The Tidewater News, of Franklin, says: Here's the chance for Southampton county to secure this highway—a chance which our progressive county cannot afford to let pass. The plan, briefly stated, is this: the formation of an association to promote the movement; the surveying of the most suitable route between the two chief cities of Virginia; the location of the best available material along this route for constructing the highway, and the general co-operation of every one in the territory of the proposed road in making it a reality. It is not proposed to build an expensive macadam road, or to issue bonds for road building in any of the counties through which it is to pass, but for the supervisors of the several counties to build the very best possible roads out of the material they have at hand with their own road crews and machinery, and to provide, of course, for their maintenance.

Portsmouth and Suffolk should also get interested in this movement.

The banquet was a big success in every respect. There was music by a good orchestra and many ladies were present.

Mayor Frank S. Hope, of Portsmouth; President F. S. Royster, of the Norfolk Chamber of Commerce; State Senator Samuel T. Montague, of Portsmouth and Norfolk county; Delegates-elect S. A. Woodward and W. P. Cousins, of Norfolk, and Supervisor Sebrell, of Southampton county, were among the invited guests present.

Mayor Mayo, of Norfolk, in welcoming Mayor Hope, of Portsmouth, said: "We are one." Mayor Hope said, "I second the motion."

State Highway Commissioner Coleman made a very able address during the evening. He said that in seven years Virginia has spent \$6,364,000 on her highways and that last year she spent \$1,411,000 and constructed 619 miles of good roads. All told in seven years this state, he said, has built from 2,000 to 2,100 miles of good roads. The state this year, he said, gave to Norfolk county \$13,760; Princess Anne county \$1,800; Nansemond, \$3,306; Southampton, \$5,238.

He said the ways to get good roads in Virginia are by direct taxation, special legislative action for bond issues, petitions to the board of supervisors and the Circuit court for special elections and by magisterial districts proceeding likewise when the whole county will not unite.

* * *

The state highway commission of Virginia has been asking for bids on several bridges, among them a 70-foot bridge across Pedlar river in Amherst county and another 70-foot steel bridge across Town creek in Franklin county.

New Edition of Catalogue

The Emerson-Brantingham Implement Company, of Rockford, Illinois, has issued a new edition of their "Big Four" catalogue, and it is a very interesting little booklet. Every road official should have a copy of it. They show in a very interesting way just what it costs to keep a dirt road in good condition with their "Big Four" kerosene tractor. By way of introduction they say:

"No community can afford to have poor roads. In the eastern states many miles of macadam road are constructed each year at great expense. The average cost of macadam road in the United States is \$13,000 per mile, according to best figures available. On account of this big expense the bulk of the rural highways will for many years be dirt roads. For the price of much less than a mile of macadam road, each county or township can buy a Big Four tractor and all necessary road machinery. With this outfit, they can grade, build and maintain from 50 to 100 miles of good dirt road each year. They can keep the roads in good hauling condition at all times. The investment will prove a benefaction to everybody in the township or county."

Engineer Riddle Goes to Florida

James Riddle, of Norfolk, Va., has been appointed supervising and resident engineer to build the system of brick roads in Hillsborough county, Florida, for which a bond issue of \$1,000,000 was voted several months ago. The question of selecting a good man has been a vexing one and it was only after much investigation that Mr. Riddle was chosen.

His salary will be \$5,000 per year and he will have entire charge of the work, with authority to employ and discharge assistants as he may be desire. The salaries of all assistants will be fixed by the board of county commissioners.

The selection of Mr. Riddle was made by the good roads committee of the Tampa Board of Trade and the county commissioners. Mr. Riddle will take charge of the work at once.

Expenditures Have Doubled Since 1904

Expenditures in the United States for improvement of roads has more than doubled since 1904, according to figures compiled by the office of public roads of the department of agriculture. In 1904 expenditures for this purpose amounted to \$79,771,417, while in 1912 the total was \$164,232,265, or an increase of \$84,450,948. It is shown that the greatest progress in road construction took place in those states that aided in the work by appropriations out of their state funds. In 1904 there were thirteen states that contributed \$2,607,000, while in 1912 there were thirty-five states that appropriated to the extent of \$43,757,438.

The expenditures for this purpose in 1912 amounted to \$74.65 per mile, which was double that of 1904, when the per mile outlay was \$37.07. The states having the largest expenditures for state aid and trunk line roads in 1912 were: New York, \$25,000,000; Pennsylvania, \$4,000,000; Maryland, \$3,370,000, and Connecticut, \$3,000,000.

On February 7 Cooke county, Texas, will vote on a bond issue of \$700,000 for road construction.

Manatee county, Florida, will vote in March on a bond issue of \$500,000 for good roads.

Lafayette, Louisiana, is asking for bids on 15 miles of cement sidewalks.

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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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THE Fourth Congress of the American Road Builders Association held in Philadelphia, December 9th to 12th was without a doubt one of the best attended and most instructive congresses yet held in this country. The large number of road engineers present from all over the country showed the attitude of those actually engaged in road building toward the work of this association. The exhibits consisted of various kinds of road materials, machinery, surveying instruments, textbooks, road magazines, paving materials, etc. etc., and were very instructive.

Among the North Carolinians present at this road congress were: Dr. Joseph Hyde Pratt, State Geologist; Mr. T. F. Hickerson, Professor of Highway Engineering in the State University; Mr. W. S. Fallis, Road Engineer of Vance county; Mr. Ira B. Mullis, Road Engineer of Yancey county; Mr. Charles H. Neal of Buncombe county; Mr. Charles R. Thomas, who has done considerable work in North Carolina but is now engaged in experimental work at the State College of Pennsylvania; and Miss H. M. Berry, secretary of the North Carolina Geological and Economic Survey.

One of the features of the congress was a paper read by Joseph Hyde Pratt, our state geologist, on "Details of Arrangements for the Use of Convict Labor." The question of using convict labor in public road construction is becoming of national importance and is being discussed from many standpoints, viz: the benefits to be derived by the state; the effect upon the individual citizens of the states; the benefits to the convict (probably the most important viewpoint of all), it being better from every standpoint to build up the character of the convict rather than degrade and turn out a worse product than was taken into the prison.

Dr. Pratt also made an excellent talk on sand-clay roads and entered into the discussion with regard to earth roads, giving the results of the work done in North Carolina with these roads.

Such congresses are becoming of educational value to road engineers and those engaged in the actual administration of road affairs. It is being more and more felt that public road funds should be withdrawn entirely from political influence and expended in a businesslike way, so that the county or township expending the sums may reap full benefit in roads well located and built and systematically maintained.

North Carolina Exhibit at the American Good Roads Congress.

The North Carolina Geological and Economic Survey was one of the exhibitors at the fourth congress of the

American Road Builders Association at Philadelphia, December 9th to 12th. An excellent space was allotted to North Carolina on the floor of the First Regiment Armory in which the sessions of the convention were held. The exhibit consisted of photographs and maps



MISS H. M. BERRY
Editor of This Department

Miss Berry is Secretary of the North Carolina Geological Survey and Assistant Secretary of the North Carolina Good Roads Association

showing the various through highways of North Carolina; as, the Central Highway, Crest of the Blue Ridge Highway, Wilmington-to-Charlotte, Charlotte-to-Asheville, the National Highway, the Capital-to-Capital Highway and the Triangular Highway. There was also a chart giving data with regard to road mileage, road

funds, etc. A series of pictures were arranged showing stretches of road at various points along the Central Highway, Crest of the Blue Ridge Highway, Capital route, Quebec-Miami, Charlotte-Asheville, and Asheville-Greenville (S. C.) Highways; also special photographs showing stretches of sand-clay road built in Lee county, in Franklinton township of Franklin county, Rocky Mt. Road District of Nash and Edgecombe counties; the macadam roads of Mecklenburg, Guilford, and New Hanover counties; and the macadam roads of Durham county along the Central Highway and the Quebec-Miami Highway.

The exhibit was commented on favorably by a great many who visited it, and much information was sought with regard to the progress North Carolina is making along various lines.

* * *

Burke county has sold \$15,000 of Morganton township bonds to an Asheville firm. It is reported that work in this township for good roads is progressing very satisfactorily.

* * *

Road Damages.

When one considers the vast ultimate benefits resulting from the construction of good roads in a neighborhood or through a farmer's plantation, it hardly seems possible that a man gifted with fair intelligence and the right spirit of citizenship would want to see any portion of a county's or township's road fund spent for so-called "damages." Yet such is the case in many sections of our state; and, instead of being willing to submit to a little personal sacrifice in order to promote the common good, the cupidity of many of our citizens is such as to hinder a public cause in this way, in order to obtain a little personal benefit.

The incident we have in mind is an editorial in the Rutherfordton Sun, which states as follows:

"At the last meeting the Road Commission decided to build no road where the people were generally demanding damages. In this decision the commission was everlastingly right. The \$250,000 will not furnish money enough to build all the roads needed in the county, and the commission owe it to the people of the county to give preference to those roads which will not be harassed and troubled with damage suits."

This attitude which is frequently met with by road officials in many of our counties which have issued bonds is to be regretted and condemned in view of the fact that the bonds are as a rule taken care of largely by the citizens of the larger towns of the county who reap the least direct benefit from their expenditure, the farmers owning the lands through which the roads go reaping the greatest direct benefit and being the ones who usually ask for the damages.

Let all good North Carolinians get together on the good roads proposition, doing everything possible to promote the most systematic and business like expenditure of these public road funds; and seek in every way to do away with all hindrances of this nature, as there are enough physical difficulties to be overcome in securing good roads everywhere throughout the state.

* * *

The Manufacturers Record on Moore County.

A recent Manufacturers' Record tells a brief but interesting story of the development of a community, following the building of good roads:

"Five years ago," says the Record, "there was a stretch of country in Moore county, N. C., in which for sixteen miles there were only three small houses and only two hundred acres of land under cultivation. A

good road was built, and on that same sixteen-mile stretch there are now two hundred dwellings, many of them exceptionally attractive and expensive farm houses, and fifty per cent of the land is under cultivation, yielding large crops."

* * *

Notes as to Recent Road Work in North Carolina.

Yancey county has disposed of her \$125,000 bond issue to an Ohio firm. There is a proposed Buncombe-Yancey Highway, part of which will probably be built out of a portion of this bond issue.

* * *

Lovelady township in Caldwell county voted on December 4th \$25,000 in bonds for good roads. This is the first township to take up the question of bond issue for road work in Caldwell county.

* * *

Orange county has six contractors at work building sand-clay roads. From all reports very satisfactory results are being obtained from the bond issue money.

* * *

Henderson county has sold about \$70,000 of road bonds, and the board of county commissioners have authorized the purchase of a sand dredge and traction engine.

* * *

The remaining \$25,000 of the Newton township bond issue of Catawba county have recently been bought in by the two Newton Banks.

* * *

It is reported that the Hendersonville-Spartanburg Highway in Polk county between Tryon and Saluda is progressing rapidly. The road is being built on a splendid grade, and will be the means of bringing a great many tourists and summer visitors to this section of North Carolina from southern points.

* * *

Iredell county has practically used up all of her \$400,000 bond issue, and is now disposing of a portion of her road building equipment, reserving only what is necessary for the upkeep of the roads. It is hoped that this county will, after building a splendid system of topsoil roads, realize the great necessity of a rigid system of maintenance, which will keep the roads in splendid condition all the year around.

* * *

Three townships of Stokes county—Sauratown, Meadows, and Danbury—have sold their bonds amounting to \$105,000 to a Chicago firm, bearing 6% interest with a premium of \$1600; and road work has already begun in these townships.

* * *

Warrenton township of Warren county on November 18th voted \$50,000 in bonds.

Cost of Convict Labor in New Hanover.

Southern Good Roads is indebted to Mr. S. W. Willard, of the board of county commissioners, for a copy of the annual report of the auditor of New Hanover county, which shows the cost of convict labor in that county to be 53 cents per day per man. The total cost for the year was \$10,066.01.

During the year 3 1/2 miles of macadam road and one concrete bridge were built, 10 1/2 miles of road oiled, 6 1/2 miles of macadam resurfaced and a great deal of other constructive work done. The convict camps in New Hanover are well managed and convict labor pays.

Halifax township, Halifax county, North Carolina, has contracted for 25 miles of sand clay roads.

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Edited by PROF. F. HORTON COLCOCK
University of South Carolina, Columbia, S. C.

SOUTHERN GOOD ROADS will devote this page exclusively to the interests of the South Carolina Good Roads Association. It will be open at all times to contributions from members of the Association in regard to Association affairs and road problems in the State. Send all contributions for this page to F. HORTON COLCOCK, University of South Carolina, Columbia, S. C.

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Mr. James F. Byrnes' Good Roads Bill.

In the House of Representatives, on December 3, 1913, Mr. Byrnes, of South Carolina, introduced the following bill; which was referred to the Committee on Roads and ordered to be printed:

A bill to provide for highway-improvement work by the United States Department of Agriculture in co-operation with the highway departments of the several states.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to promote the adoption of better methods of road construction and maintenance, and to assist in the development of an adequate system of improved roads, highway work may be inaugurated in each state through the co-operation of the United States Department of Agriculture and the highway departments of the several states. Such co-operative work shall embrace practical demonstrations in road construction and maintenance upon highways to be mutually selected by the secretary of agriculture, or his representative, and the representatives of the several state highway departments; and all such work of construction, improvement, and maintenance shall be carried on in such manner as may be agreed upon by the Secretary of Agriculture, or his representative, and the representatives of the several state highway departments.

Sec. 2. That there is hereby appropriated for the fiscal year ending June thirtieth, nineteen hundred and fourteen, the sum of \$3,000,000, for the fiscal year ending June thirtieth, nineteen hundred and fifteen, the sum of \$6,000,000, and for each fiscal year thereafter the sum of \$12,000,000, for the purpose of carrying out the provisions of this act.

Sec. 3. That the appropriation herein made shall be apportioned to the several states by the Secretary of Agriculture in the following manner: One-third shall be apportioned to each state in the proportion which the total area of the state bears to the total area of the United States; one-third shall be so apportioned in the proportion which the total mileage of rural delivery and star routes bears to the total mileage of rural delivery and star routes in the U. S.; and one-third shall be so apportioned in the proportion that the population of the state bears to the population of the United States. Such apportionments, so far as regards area and population, shall be based upon the last preceding federal census, and, so far as regards the mileage of rural delivery and

star routes, upon the last preceding report of the Postmaster General: Provided, That no payment of such apportionments, or any part thereof, to any state in any year, shall be made until a like sum has been appropriated for such year by the legislature of such state, or shall have been raised by said state in any other manner for such purposes.

Sec. 4. That on or before July first of each year there shall be submitted by each state highway department, and approved by the Secretary of Agriculture, projects setting forth the proposed work to be carried on under this act, and the funds herein appropriated shall not become available to such state highway department for that fiscal year unless such projects shall have been submitted in accordance herewith and approved by the Secretary of Agriculture.

Sec. 5. That the appropriations herein made, after being apportioned as herein provided, shall be paid in such amounts and at such times as may be agreed upon by the Secretary of Agriculture, or his representative, and the representatives of the several state highway departments. Such disbursements shall be by the Secretary of the Treasury, upon the warrant of the Secretary of Agriculture, out of the Treasury of the United States to the treasurer or other officer of the state authorized by law to receive the same, and such officer to whom payment shall be so made shall be required, on or before the first of September of each year, to report to the Secretary of Agriculture, in detail, the amount, or amounts, so received during the preceding fiscal year and of its disbursement on such forms which may be prescribed by the Secretary of Agriculture: Provided, That no right of supervision or other participation in the work shall vest in or be exercised by the Secretary of Agriculture after the United States Government shall have ceased to share in the expense of such work.

Sec. 6. That for the purpose of carrying out the provisions of this act, the Secretary of Agriculture is hereby authorized to employ common labor, clerical and technical assistance, and to purchase supplies, office fixtures, and apparatus, in the city of Washington and elsewhere, and to incur travel and other necessary expenses incident to the operation of this act.

Sec. 7. That on or before January first of each year, each state highway department shall be required to make to the governor of the state a detailed report of its participation in the highway work provided for in this act, including a statement of receipts from all

sources and disbursements, one copy of which report shall be sent to the Secretary of Agriculture and one to the Secretary of the Treasury.

Sec. 8. That on or before July first of each year it shall be the duty of the Secretary of Agriculture to ascertain and certify to the Secretary of the Treasury as to each state the amount of funds apportioned to it for highway-improvement work under this act, and whether it is entitled to receive the same. If the Secretary of Agriculture shall withhold from any state its apportionment of the appropriation herein made, the reasons therefor shall be certified in detail to the Secretary of the Treasury, and the amount so involved shall be kept separate in the treasury until the expiration of the session of congress following the next suc-

ceeding session of the legislature of such state as may have such apportionment so withheld, in order that the state may, should it so desire, appeal from the action of the Secretary of Agriculture to the congress, and if such next congress shall not direct that the apportionment so withheld be paid to such state, it shall then be covered back into the treasury. There shall be made by the Secretary of Agriculture to Congress an annual report giving the receipts, expenditures, and the results of the highway improvement work in the several states availing themselves of the benefits of this act, together with a statement as to whether the apportionment of any state has been withheld, and the reason for so withholding same.

European Highways

By JOHN C. NICHOLSON

Secretary-Treasurer of the Meridian Road

FOR centuries the main traveled roads in Europe have been in constant use. The Appian Way, built three hundred B. C. is now and has been for centuries so badly rutted that it is a hard road to travel. The surface is blocks of stone about twenty inches square with the edges worn off about two inches deep, which makes this road shunned by the automobilist. It has the foundation but the smooth surface is sadly wanting.

The main country roads in England, Scotland, Germany and France are in fine condition and kept so by constant repairs. Every few hundred yards is a pile of stone and a repair man. The macadam roads, with the very hard rock that they use will ravel out and once a year, usually in the spring, the road is given an overhauling. The ditches are kept open and water is never allowed to stand by the roadside. For hundreds of years they have been pounding rock into the road and the same are passable rain or no rain. It has been found necessary to use some kind of a binder on the roads used by the automobiles.

The national roads in France were constructed and are maintained by the national government, but the inter-city roads were constructed and are maintained by the provinces and the rural roads are kept up by the farmers. The main road from Edinburgh and Glasgow north was an old military road and is maintained in excellent condition. Nearly all of the roads in England are in good condition and the main roads in Germany are macadam roads and need a binder. Switzerland has some very expensive and fine roads across the Alps, but only a few of them are open for automobile traffic. The roads in Italy are dusty and generally worn out and sadly in need of repairs. Greece has but a few miles of good roads. The main roads in Holland and Belgium are hard roads.

The highways of Europe are generally narrow and crooked and bounded on either side by obstructions which require great caution and in England the farm views are hidden quite generally by high hedges. In many places an earth fence was thrown up which is overgrown now with a high hedge.

It seemed to us that most of the automobiles in the cities of Europe were for hire and that nearly all of the others belonged to American tourists. The bicycle is largely used by residents and the motorcycle or motorcycle with side wheel and basket attachment is a familiar means of transportation for many tourists.

Excellent roads maps and roads guides can be had on

the lines of tourists travel in the British Isles, France, Germany, etc. The roads are sign posted and have distance signs, and the automobile clubs have erected warning signs. Foreign duties, license fees and regulations are annoying to automobilists, and oil and gasoline are very high. In Paris a revenue tax of ten cents a gallon is charged and the money used to maintain the highways. Even the finest streets in Paris are not in good condition but nearly all of the streets of London and Berlin are in fine condition. Chicago and New York have better streets for automobiling than any of the streets in Europe.

The scenery in the Alps is considered so fine because the roads and paths across the Alps permits the tourist to see it at the best advantage. When we have good roads and good paths through the Rockies and the Sierra Nevadas, scenic Aemrica will surpass scenic Europe. Automobile and tourist rail traffic follow practically the same lines. The cities and towns located on the tourist lines of travel reap a rich harvest, while the out of way places go hungry. I believe the dirt roads and clear skies in this country offer more days for good automobiling than the hard roads of Europe with their cold, rainy, disagreeable weather, which is so common during the tourist season.

Bradley county, Tennessee, will spend \$75,000 in resurfacing and repairing roads.

Jackson county, Tennessee, voted last month a bond issue of \$100,000 for roads.

Concord, North Carolina, will lay 6,000 feet of bitulithic at a cost of \$12,000.

Calhoun county, Alabama, will construct two miles of model macadam road.

Clay county, Florida, has voted bonds for \$150,000 for road construction.

Punta Gorda, Florida, has issued \$75,000 of bonds for street work.

Cordele, Georgia, will expend \$120,000 in paving streets.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Arkansas.

President W. A. Coker of the Arkansas Good Roads and Drainage Association has forwarded to George R. Brown secretary, the tentative program for the twelfth annual meeting of the association to be held at the Hotel Marion, Little Rock, January 14 and 15.

Judge Coker, in his letter, states that there will be a discussion at each session of the association on "Road Building," by the county judges and road overseers of the state. Also that each set address will be limited to 40 minutes. The tentative program is as follows, and invitations have already been forwarded to the gentlemen selected. The position on the program of the parties to deliver addresses will not be decided upon until the replies are received:

Invocation, Rev. Sam Campbell, Little Rock.

Welcome address, Judge Joe Asher, Little Rock.

"Earth Road Construction and Maintenance," E. A. Kingsley, state highway engineer, Little Rock.

"The Roads of Northeast Arkansas," C. W. Highfill, Paragould.

"The Arkansas Goods Roads Law; Its Purposes and Results," A. V. Smith, Brinkley.

"Brinkley, Little Rock, Memphis Highway; A Link in Arkansas of the Southern National Highway," Dr. E. B. McKnight, Brinkley.

"The Necessity of Drainage and Its Benefits to the Low Lands of Arkansas," S. M. Taylor, Pine Bluff.

"The Great Highway and Its Benefits to Arkansas," Dell M. Potter, Clifton, Ariz., president Southern National Highway Association.

"The Roads of Arkansas and Their Importance," Governor J. M. Futrell, Paragould.

"The Levee Situation," Charles H. Miller, Little Rock.

"The Government Side of the Case," M. O. Eldridge, of the office of public roads, Washington, D. C.

"What the Federal Government is Doing," George D. Marshall, of the office of public roads, Washington, D. C.

"The General Road Situation," Logan Waller Page, director of the office of public roads, Washington, D. C.

"The Government's Part in Road Construction," H. M. Jacoway, Dardanelle.

"The Relation of the Railroad to the Public Highway," Colonel B. F. Bush, president Missouri Pacific-Iron Mountain roads, St. Louis.

"Where I Stand on Road Legislation," Governor George W. Hays, Little Rock.

"The Interest of the Rural District in Good Roads," Heartsill Ragan, Clarksville.

* * *

Florida.

Hon. Park Trammel, governor of Florida, who has won the title of "Good Roads Governor" in his state, just as Governor Craig, of North Carolina, Governor Hays, of Arkansas, Governor Hodges, of Kansas, Governor O'Neal, of Alabama and Governor Major, of Missouri, have won it—by real achievement along good roads lines—was asked to designate some one to prepare for Southern Good Roads an article outlining the work done in Florida on Good Roads Day in November. Governor Trammel was unable to comply with

the request but wrote the following very interesting letter:

STATE OF FLORIDA
EXECUTIVE CHAMBER
Tallahassee

December 2, 1913.

Mr. A. L. Fletcher,

Managing Editor Southern Good Roads,
Lexington, N. C.

Dear Sir:—

I am in receipt of your letter of the 26th ultimo, in which you ask that I have someone to write an article for your paper relative to the success of Good Roads Day in this state.

In reply beg to advise that just at present I cannot think of anyone that has probably kept close enough in touch with this matter to write an article thoroughly covering what was done.

I will state that from information which I gained through the press of the state, it appears that the day was observed in approximately seventy five per cent of the counties of the state. In a large majority of the counties great interest was manifested and quite a representative percentage of the people turned out and participated in the work of the day. In some localities the citizens organized and raised funds for carrying on the work. In this way quite a good deal of work was accomplished. In some localities several hundred dollars was contributed in donations of from one to five dollars. The agitation seemed to have also resulted in the organization of a number of good roads associations. These associations require each member to donate the sum of one dollar per month for a period of three to six months for the purpose of aiding in the repairing of the roads in the localities where the associations were formed.

This information will possibly be of some value to you.

Yours very truly,

PARK TRAMMEL,
Governor.

* * *
Oklahoma.

The Chamber of Commerce of Bartlesville, Oklahoma, recently conducted a good roads essay contest among the children of Washington county, and first prize was won by little Miss Esther Olsen age 11, of School District No. 21, Washington county. Her little essay is worth space here and it is not out of place to say that the day of bad roads in Washington county will be numbered with the things that were, if the work of educating the children to the need of better roads is kept up.

The little girl wrote as follows:

"A team can pull a larger load over good roads than they can over bad ones. A bad road is a road where water stands in the roads and where there are ditches and rocks.

"Roads should be made higher in the center so that water that falls in the road can run off to one side. Ditches on each side of the road help to drain the roads and also to keep water that falls on higher ground than the road from getting into or running across the road. When weeds or other rubbish gets into the ditch the

water cannot easily get away. This keeps the road bed soft and travel soon cuts it full of ruts and holes.

"The split log drag is useful in keeping up the roads. It should be dragged at a slant so that the earth that it moves is pushed to the center of the road. One half of the road should be dragged with a team going one way and the other half should be dragged with a team going in the opposite direction.

"The roads should be dragged after a rain as soon as the earth begins to dry up.

"If it costs a farmer one dollar a mile to drag roads, he would be repaid for such labor by having a smooth firm road to travel over. No matter where he went he would be getting the benefit of his own work as well as that of others.

"If every farmer would drag one mile of road, all would have a good road to travel over."

Second prize went to Brant L. Rodecker, a student at Oglesby school, Oglesby, Oklahoma, and his essay was almost as good as that of the winner. He, too, is 11 years old.

* * *

Ohio.

Nearly 20,000 new members have been enrolled within the last two months in the Ohio Good Roads Federation, an organization which is devoted to the promotion of highway improvement, especially by using its power and influence to insure adequate support for good roads from the public treasury of the state.

Its growth is striking evidence of the deep interest felt by a multitude of Ohioans in the building and maintenance of roads good all the year in all kinds of weather, says the Cleveland Leader.

Every such manifestation of public sentiment promotes highway improvement, not only through the activities of state government, but in the counties and minor civil divisions of the commonwealth. The part played by zealous and energetic advocates of road betterment in Ohio is one of the most vital importance. Every such cause must have its leaders and its organized workers to get satisfactory results, and the Good Roads Federation is certain to have far more effect upon highway improvement in this state than its members could hope for from individual effort.

* * *

New York.

The New York Tribune comments on the highway situation in the Empire State as follows:

Testimony in the John Doe investigation conducted by District Whitman now indicates that all the highway graft was not collected by political bagmen for campaign funds. If the story told by Aldrich, a contractor, who swears he was relieved of \$1,500 by one of State Engineer Bensel's confidential men, be true, there has been opened a vista of private or individual graft collecting which may be quite as important as that of the political specialists. All that seemed to be necessary was to possess some official connection with a state department to mention the name of some other official having jurisdiction over highway work and to promise to relieve the contractor of department hardships or facilitate the workings of department routine for his benefit. Then the money came—and no checks to be traced, either.

Each new revelation of this investigation shows how shockingly rotten the highway affairs have been ever since Tammany first began to play politics with the state's roads by wiping out the Hughes Highway Commission in the first year of the Dix administration. The contracts have been bad, the work has been bad, the state has been robbed, the contractors have been black-

mailed by politicians and maybe by state officials. Tammany's blighting touch has been on all. It ought not to be wholly impossible to build honest roads honestly, without graft for officeholders or political bagmen or graft for contractors and supply men. The Hughes commission had begun to do it when Tammany came into power and turned it out on pretence of economy. Maybe after the investigation has revealed all the rottenness and some of the grafters are in jail honest road building by honest men may be resumed.

* * *

Tennessee.

A very enthusiastic road meeting was held at Mountain City, Tennessee on December 6th which was addressed by Joseph Hyde Pratt, State Geologist of North Carolina and Ex-Governor Cox of Tennessee. There were between 400 and 500 people crowded into the courthouse, and they were all there in the interest of Good Roads for Johnson county. Neither in the courthouse or outside was a single expression heard that was not in favor of good roads for Johnson county, and of obtaining them by means of a bond issue. The following resolutions were unanimously adopted by a rising vote at the meeting:

"Resolved that we favor a system of improved, modern roads for Johnson county to be built by a bond issue or issues; and

"Resolved that we favor the issuance of bonds equal to 10% of the assessed values of the county, amounting to from \$150,000 to \$160,000, as a beginning; and

"Resolved that said bond issue should be expended in building two main roads through the county, one of which roads shall begin at the North Carolina line near Trade and extend via Mountain City through the Shady Valley to the Sullivan county line on Holston Mountain, and the other of said roads to extend from the Virginia line on the Laurel Creek via Mountain City to the Watauga River bridge in the town of Butler; and

"Resolved Further that the County Court of Johnson county be requested, as soon as practicable under the law, to elect Pike Road Commissioners for this county, and take the necessary and proper steps to carry out the foregoing resolutions by submitting the question of the issuance of said pike bonds to a vote of the people of Johnson county."

The Johnson County Good Roads Association was organized with the following officers:

President—J. N. Willis, Mountain City, Tenn.

Secretary-Treasurer—I. S. Rambo, Mountain City, Tenn.

Vice-presidents were named as follows:

District No. 1—W. S. Robinson, Laurel Bloomery, Tenn.; District No. 2—John H. Cress, Mountain City, Tenn.; District No. 3—Dr. J. G. Butler, Shouns, Tenn.; District No. 4—Dr. W. W. Vaught, Shouns, Tenn.; District No. 5—D. S. Vaught, Butler, Tenn.; District No. 6—W. B. Robinson, Doevoile, Tenn.; District No. 7—T. J. Walsh, Mountain City, Tenn.; District No. 8—W. S. Cole, Crandull, Tenn.; District No. 9—T. Z. T. Johnson, Trade, Tenn.; District No. 10—J. C. Dugger, Butler, Tenn.

* * *

Texas.

A letter from Texas in the Manufacturers' Record of January 1st. calls attention to the fact that in the month of November road bonds were voted on in nine counties of Texas, carrying in five. The amount voted on during November was \$1,719,000, and \$1,265,000 was voted. The counties in which the elections result-

ed in favor of the bond issues are as follows: Bexar, November 12, \$750,000; Ellis, November 20, \$35,000; Hill, Nov. 22, \$250,000; Kinney, November 14, \$80,000, and Walker, November 14, \$150,000. The defeated issues were voted on in the following counties: Matagorda, November 22, \$75,000; Palo Pinto, November 26, \$200,000; San Patricio, November 26, \$14,000, and Val Verde, November 25, \$165,000.

Eleven elections were scheduled for December, involving \$1,200,000 and from these elections no report has been received. This correspondent goes on to state that voters in the counties have signified their intentions of holding elections in the near future, but the date the issues will be decided has not yet been set; Bell, \$500,000; Bowie, \$500,000; Comanche, \$50,000; Denton, \$125,000; Cooke (amount not determined); Fannin, \$250,000; Hill, \$150,000; Harrison, \$300,000; Hunts, \$200,000; Leon, \$50,000; McLennan, \$100,000; Montgomery, \$250,000; Nueces, \$500,000; Nueces, \$250,000; Red River, \$200,000; Reeves, \$100,000; Runnels, \$225,000; Upshur, \$40,000; Walker, \$50,000.

From January 1, 1913, to the close of November, 76 road and bridge bond elections, which involved a total of \$10,689,000, were voted on in Texas. Forty-five of these issues, with bonds aggregating \$6,560,000 in value, were successfully carried, while 31 of the issues met with defeat. The amount of bond issues defeated in 1913 is \$4,129,000. The largest bond issue last year was for \$1,000,000, voted on in Harris county, February 20, and carried by an overwhelming majority. Bexar county on November 12 carried a \$750,000 issue, \$550,000 of which will be used in highway building and maintenance, and \$200,000 for bridge work.

The Chamber of Commerce of Fort Worth, Texas, sends out the following announcement:

From the point of view of the whole state, no convention that is to meet at Fort Worth in the year 1914, is of equal importance to the meeting of the Good Roads Association convention that will assemble in Fort Worth Jan. 26 for a three days session.

Transportation is the life of commerce and in that vital element of commercial life, moving farm products to market, no means is of more intimate interest than the good roads of the county. In recognition of that truth, the Chamber of Commerce has been most active in encouragement of road improvement.

Therefore, it feels a distinct satisfaction that its efforts to secure the meeting of the Texas Good Roads Association, for Fort Worth have been successful.

That the meeting might have the utmost possible value to the people of Texas, alive to the importance of road improvement, the Chamber of Commerce has the promise of the United States Department of Agriculture, Office of Public Roads, that the department's valuable and comprehensive exhibit of road models shall be in Fort Worth for use at that meeting, the models to be installed and demonstrated by one of the U. S. Public Road experts. That the influence of the Chamber of Commerce and the reputation Fort Worth has made as the good roads center of Texas, with her people alive to the value of road improvement of the best and most scientific kind, have made it possible to have this extensive, complete road exhibit, makes certain that those attending the Fort Worth Good Roads convention will have exceptional advantages for studying road construction of many kinds. Many competent men will talk on road improvement and neither officials nor laymen, charged with good road construction or concerned in road improvement, should fail to attend this association meeting, enjoy the hospitality of the

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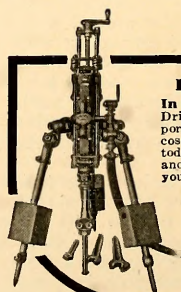
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citizens of Fort Worth and know even better, Fort Worth, the Good Roads and Transportation Center of Texas.

BRIDGES AND CULVERTS

The board of aldermen of the city of Birmingham, Alabama, have ordered the Southern Railway Company to build an overhead crossing on First Avenue at a cost estimated at \$177,500.

The commissioners of Greene county, Georgia, will bridge the Oconee river near Watson Springs at a cost of \$5,000.

The city of Houston, Texas, will construct a reinforced concrete bridge across Buffalo Bayou at a cost of \$140,000. The contract will be left about February

1 and later plans will be prepared for another bridge, this one on Preston Avenue, to cost \$130,000.

Claiborne county, Mississippi, will issue bonds for \$10,000 to build several small bridges and culverts.

Logan county, Oklahoma, will bridge Cimarron river near Guthrie.

The city of Fort Worth and Tarrant county, Texas, will unite in the construction of a steel bridge over Trinity river to cost \$15,700.

A movement is on foot to connect Sumter and Crisp counties, Georgia, by bridging Flint river on the Cordele-American Highway. It will cost about \$20,000.

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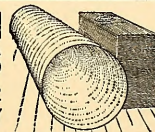
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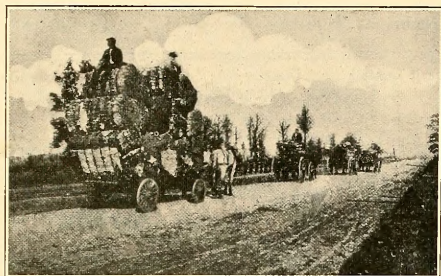
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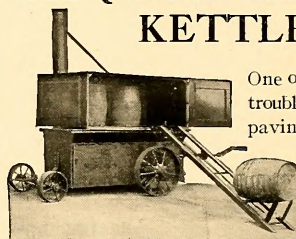
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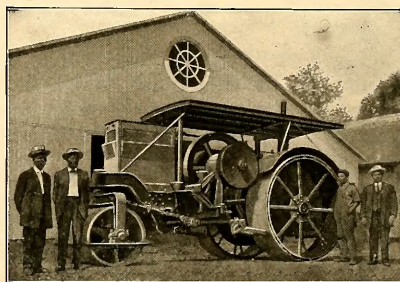
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Road Construction in Mountainous Sections

By WILLIAM F. COCKE

Assistant State Engineer, Vice-President Virginia Road Builders' Association

THE first object of a highway is to serve the people living in the section through which it passes, and give as large a number of them as possible a means of reaching the centers of trade. The second object is to connect these centers one with another by the shortest route, and over the best alignment and grades that can be obtained.

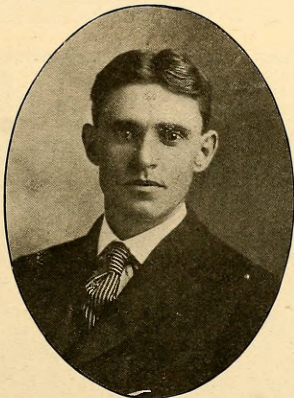
In locating a highway through a mountainous and partially developed country, these two objects often come into direct conflict. The natural solution of this

of a large stream. When the time came to rebuild and improve this highway a much better location was surveyed, passing through this low gap and descending by a shorter distance and better grades to the same crossing of this stream. The only object in carrying the road past the low gap referred to, was the accommodation of a few families living along the ridge beyond this gap. The difference in cost in favor of the new route was something over \$40,000.00, yet the change was voted down in spite of the advice and protests of the engineers.

Since the completion of this road the citizens of the county have publicly expressed their regret that they did not adopt the new survey, and later build a cheaper by-road for the accommodation of the families living beyond the gap.

In making the final location these general considerations must, of course, be governed by several details, the first and most important of which is safety.

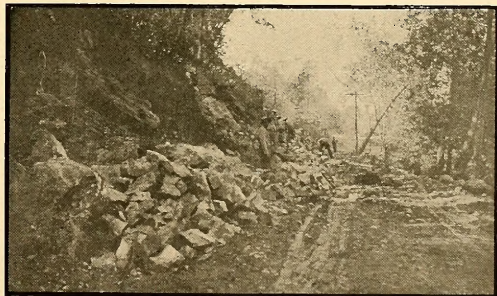
Where there is a fast automobile traffic, short abrupt curves are very dangerous, and in some states a



WILLIAM F. COCKE

problem would seem to be to locate on the shortest and best line obtainable between two given points, and then build by-roads or feeders for the accommodation of the citizens who are not so fortunate as to live immediately upon this route. However, it usually happens that an amount of money is appropriated which will barely build the single line of road between these points, and as the citizens seldom look beyond their present needs, the engineer who is doing pioneer road work in a mountain country is often forced to construct on a location that will be the object of just criticism from future generations.

The writer recalls a striking illustration of this in one of the mountain counties of Virginia. A road leading from the county seat to the county seat of an adjoining county passed by a low gap in the mountain and climbed the ridge beyond, only to drop down very abruptly on the other side of this ridge to the crossing



Heavy rock grading on the Roanoke-Hollins Road, in Roanoke county, Virginia

minimum radius of 200 feet is required. In a rough mountain country such a length of radius is very often impossible, unless impracticable grades are attempted, or else tunnelling is resorted to. As tunnelling usually costs not less than \$60 per lineal foot, this class of construction is too expensive to be considered in this discussion.

For ordinary rural traffic, including a fair per cent of automobiles, a minimum radius of 60 feet might be allowed, provided the curves were carefully constructed and the grades flattened at that point. I can recall

several instances, in the mountains of southwest Virginia, where it was only at great expense that as much as a 30 foot radius could be obtained, but these curves are very dangerous and should not be allowed except where it is impossible to obtain anything better.

You will please bear in mind that we are discussing road work in a mountain country and these limits should not be considered as allowable in a rolling or level section.

The importance of avoiding grade crossings of railroad tracks is too generally recognized to require discussion in this article.

The second detail which should be carefully considered in making a location is the comparative cost of maintenance. The ruling grades have a very important bearing on this question and the maximum and minimum grade, for any particular class of road surfacing, should be carefully considered before construction is begun.

The rules which govern the maximum and minimum grades are not deep or theoretical, but on the contrary, are very simple and practical. The minimum grade is the least fall that will freely carry off the surface water, through the style of gutter which it is proposed to use. For instance, where a common earth gutter is used, the fall should not be less than one foot in one hundred, or 1%.

Where it is proposed to use a stone or concrete gutter, as is seldom the case in a newly settled mountainous country, the fall may be as low as three inches to the hundred feet, or 0.25%.

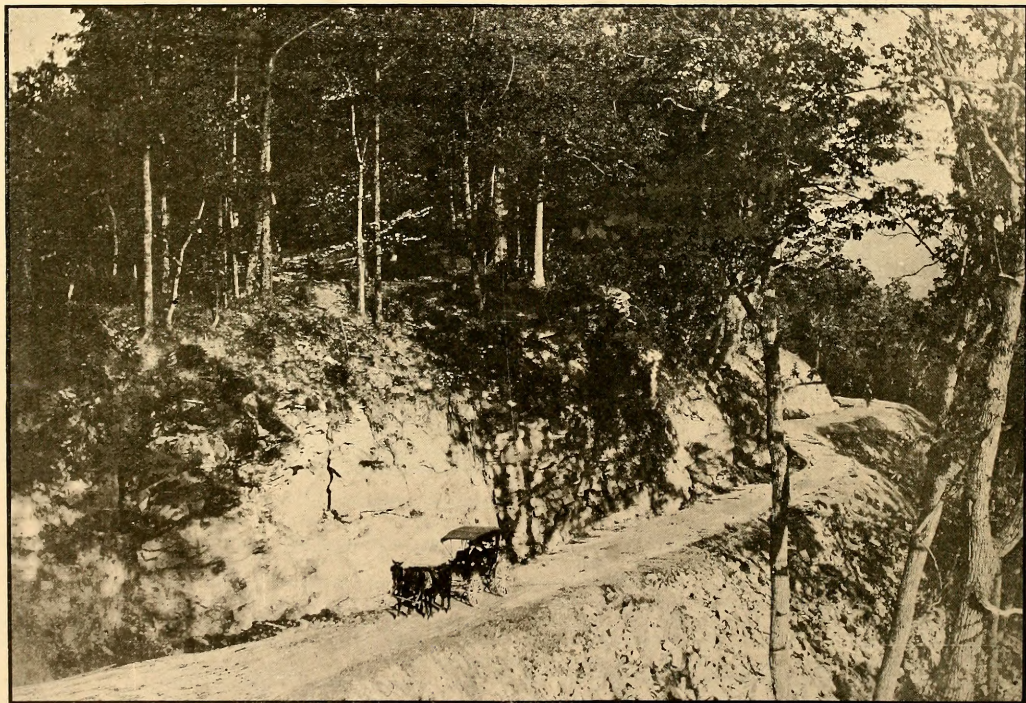
The maximum grade is necessarily less than the

greatest transverse slope that can be given the crown of the road bed, because if the longitudinal grade be equal to or greater than the transverse grade, the tendency of the water will be to follow along the center of the road instead of shedding to the sides and being carried away in the gutters.

The steepest transverse grade or crown which can be safely used is one inch to the foot, and only the common dirt road can be given this maximum, as a vehicle would have a tendency to skid or slip on a hard surface as steep as this.

A rise of one inch to the foot is equal to about eight per cent, so it is safe to assume that the steepest grade that can be used on a dirt road is 7%, but the maintenance on this will be found to be excessive and its use is poor economy if a lighter grade can be obtained.

The steepest transverse rise that can be safely used on a macadam surface is $\frac{3}{4}$ of an inch to the foot, which is equal to about a 6% grade, therefore by the same course of reasoning, we are forced to the conclusion that a water bound macadam road should not be steeper than 5%. It is therefore evident that if we are obliged to build on a grade steeper than 7%, a surface must be used which will withstand the action of water. Macadam can be laid with a bituminous binder which will, to a certain extent, hold its own on steep grades, but on account of its slippery surface it is unsafe, beyond a certain limit, say about 8 or 9%. It therefore appears that the only road surface for very steep grades is a rubble stone paving which will withstand the action of water and at the same time afford a safe footing.



Heavy work between Wise and Coeburn, in Wise county, Virginia. This section of road, showing a side cut in the mountain, is part of a mile in which there was 27,000 cubic yards of excavation.



A beautiful macadam road in the mountains of Wise County, Virginia. This section of road was built under the supervision U.S. Office of Public Roads

In rural sections, where horse drawn traffic is still in the majority, seventy-five per cent of the maintenance

evident that the problem of surface water is much more difficult to handle in a mountain section than in a gently rolling country. For this reason the surface water should be carried away from the road at as frequent intervals as possible, and the cross drains placed near enough together to relieve the gutters before the water has gained sufficient volume to float heavy material, which would be liable to choke the cross drains with debris.

A mountain section usually abounds in wet weather springs, especially on the northern slopes, therefore under drainage is no less important than surface drainage. Where drain tile cannot be readily had, a common French drain will give excellent service.

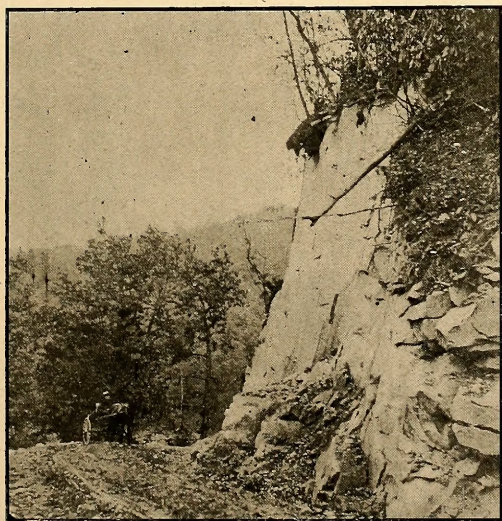
Sunshine is the maintenance man's best friend, and a road should never be built on a northern slope if it can possibly be avoided.

The narrowest roadbed on which two vehicles can safely pass is 16 feet. The least width which can be allowed for each gutter is two feet. This will give a total width of 20 feet in through cutting and 18 feet in side cutting.

This width of roadbed will carry only ten feet of metal, as a three foot shoulder is necessary on each side to hold the macadam. Therefore for each additional foot of macadam, the width of grading will have to be increased accordingly.

Sixteen feet will strike most persons as a very cramped and narrow road-bed, but when you attempt to construct on ground lying at an angle of from 30 to 48 degrees, it can be readily seen that each additional foot of width will add far more than a proportionate amount to the cost of the grading. On ground lying at an angle of 35 degrees, an increase of 1-6 in width will add about 1-3 to the excavation.

In the mountain counties of Virginia, there are many



A 48 foot cut in Fox Gap, Wise county, Virginia, showing the difficulties encountered in mountainous sections.

problems can be summed up under one head; viz., control of water.

As the rate of velocity of water increases, its eroding power increases by something like its square, so it is

miles of highway built on ground as steep as that mentioned and in some cases the excavation on a 16 foot road-bed has run as high as 30,000 cubic yards to the mile.

The foregoing is only a brief outline of what I have found to be the most vital questions which meet the engineer employed on road work in a mountain section.

Contractors familiar with road work, are at this time, an exception in Virginia.

It is therefore important that the engineer should have a practical idea of handling the details of construction. The resident engineer should not be expected to supervise more work than he can with ease cover every day, and where macadam is being laid or bridges erected, there should be competent inspectors constantly on the ground.

If the maintenance problems which have been discussed are not constantly borne in mind by the constructing engineer, his work will always be incomplete. A knowledge of construction work alone will never give an insight into the numberless details which will continue to confront the maintenance man after the constructing engineer has left the work and been forgotten, except for his mistakes.

Mr. George W. Tillson, M. Soc. C. E., Consulting Engineer to the President of the Borough of Brooklyn, New York City, on January 23rd delivered an illustrated lecture on "Details of Construction of Car Tracks in City Pavements" before the Graduate Students in Highway Engineering at Columbia University.

The city of Baltimore, Maryland, has contracted for 116,800 square yards of sheet asphalt, and 13,800 square yards of vitrified brick paving.

Houston, Texas, contracted last month for street paving amounting to \$40,000.

Alabama Good Roads Association Prepares for an Aggressive Campaign.

The executive committee of the Alabama Good Roads Association met in Birmingham on January 22nd. This committee is composed of over forty prominent and leading good roads advocates in the state. The meeting was an enthusiastic and earnest one and a number of plans in the interest of the association and the cause of good roads were mapped out. A movement was put on foot to make an effort to secure at least 10,000 dues-paying members at \$1.00 per year during the year. The Finance Committee was instructed to put solicitors in the field to push this work and to organize county good roads associations. Resolutions urging the people to observe Good Roads Days, August 14th, 15th and 16th were passed. These resolutions called upon governor Emmet O'Neal to issue a proclamation calling upon the people and the road officials in every county in the state to observe the same.

President John Craft and Secretary J. A. Rountree were instructed to write to the Governor, also to candidates for the senate and state legislature and ask their views in regard to financing the state's share in accepting federal aid and in regard to appropriating money to maintain the public roads of the state, as well as placing state convicts upon the public highways. The association will make every effort possible to help fill the next legislature of Alabama with good roads advocates and those that will take no backward steps in good roads legislation. The association decided to amalgamate and affiliate with the United States Good Roads Association of which Senator John H. Bankhead is president and J. A. Rountree Secretary. President Craft was instructed to appoint 100 delegates to attend the 1914 meeting, which will be held in Tulsa, Okla. The date of meeting to be named later.

Ginter Park, a suburb of Richmond, Virginia, has contracted for street paving to cost \$75,000.



Well Graded Road at the Head of Dry Fork in Wise County, Virginia

Progress Made For the Building of the "Boone Way"

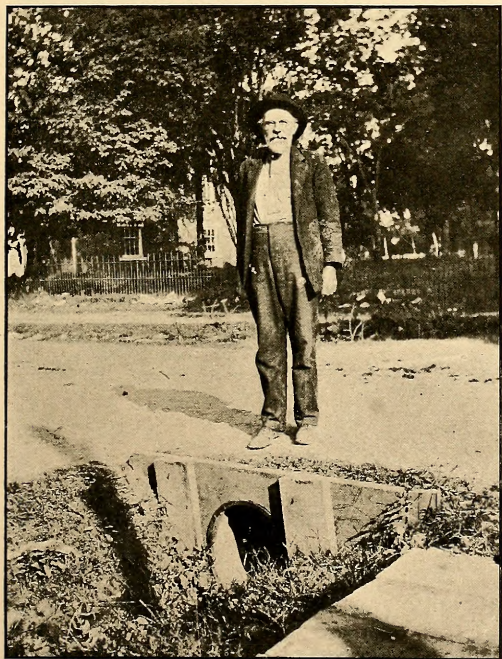
By JAMES MARET, Mt. Vernon, Ky.

IN REPORTING progress of the movement for establishing a proposed National Highway from Cumberland Gap to Crab Orchard, Kentucky, a distance of 98 miles, following "Boone's Trail" and the old "Wilderness Road," said highway to be named "Boone Way" in honor of that famous frontiersman, Daniel Boone, who conducted Col. Richard Henderson's Transylvania Colony from North Carolina into the "dark and bloody ground" in March, 1775, I would say the undertaking was revived by the Mt. Vernon Commercial Club of Mt. Vernon, Kentucky, in January of last year, assisted by an auxiliary organization, known as the Boone Way Booster Band. The first move made was to ascertain the feeling of Kentucky's delegation in congress and the governors of the states surrounding us. Favorable replies endorsing the cause and assurances were received from the congressmen, and the governors promised to use their influence with the congressmen in their various states to endorse the movement when presented in Washington. Speaker Champ Clark "looks upon the undertaking with a very favorable eye;" Senators W. O. Bradley and Ol-

port the cause. In our literature sent out we appealed to every native of Kentucky, Tennessee, North Carolina, Virginia, and native sons of these states now living in other states, to request the congressmen of their adopted states to stand up for the cause.

Chambers of Commerce, Boards of Trade and Commercial Clubs, of Louisville, Cincinnati, Danville, London, Middlesboro, Knoxville, Richmond, Asheville, and many others have endorsed our work, and a number of them are actively assisting in pushing it along. "Kentucky Societies" in a number of states are lending a hand. The D. A. R. of Kentucky, Tennessee, Virginia and North Carolina, who propose putting stone markers, with memorial tablets thereon, every ten miles along Boone's Trail, from its beginning in North Carolina to the site of Old Fort Boonesboro, Kentucky, are aiding in our work. We have recently learned that the North Carolina relatives of Col. Henderson are desirous of calling the old path "Henderson's Trail" instead of for Boone. This probably may have caused the delay in erecting the proposed markers over the route.

In the month of June, 1913, the Agricultural Department at Washington, on the request of Senator Bradley, of Kentucky, sent out a highway engineer, who made a reconnaissance survey of the proposed road. His report shows his estimate of cost for the 98 miles to be \$1,025,000. Senator Bradley recently introduced a bill in the senate for making an appropriation to cover the cost of putting on a corps of engineers to make a more practical survey and estimate.



This is Mr. John W. Moore, Chairman of the Road Commission of Northampton County, North Carolina. The Culvert is Shown in Front of the Courthouse at Jackson, N. C.

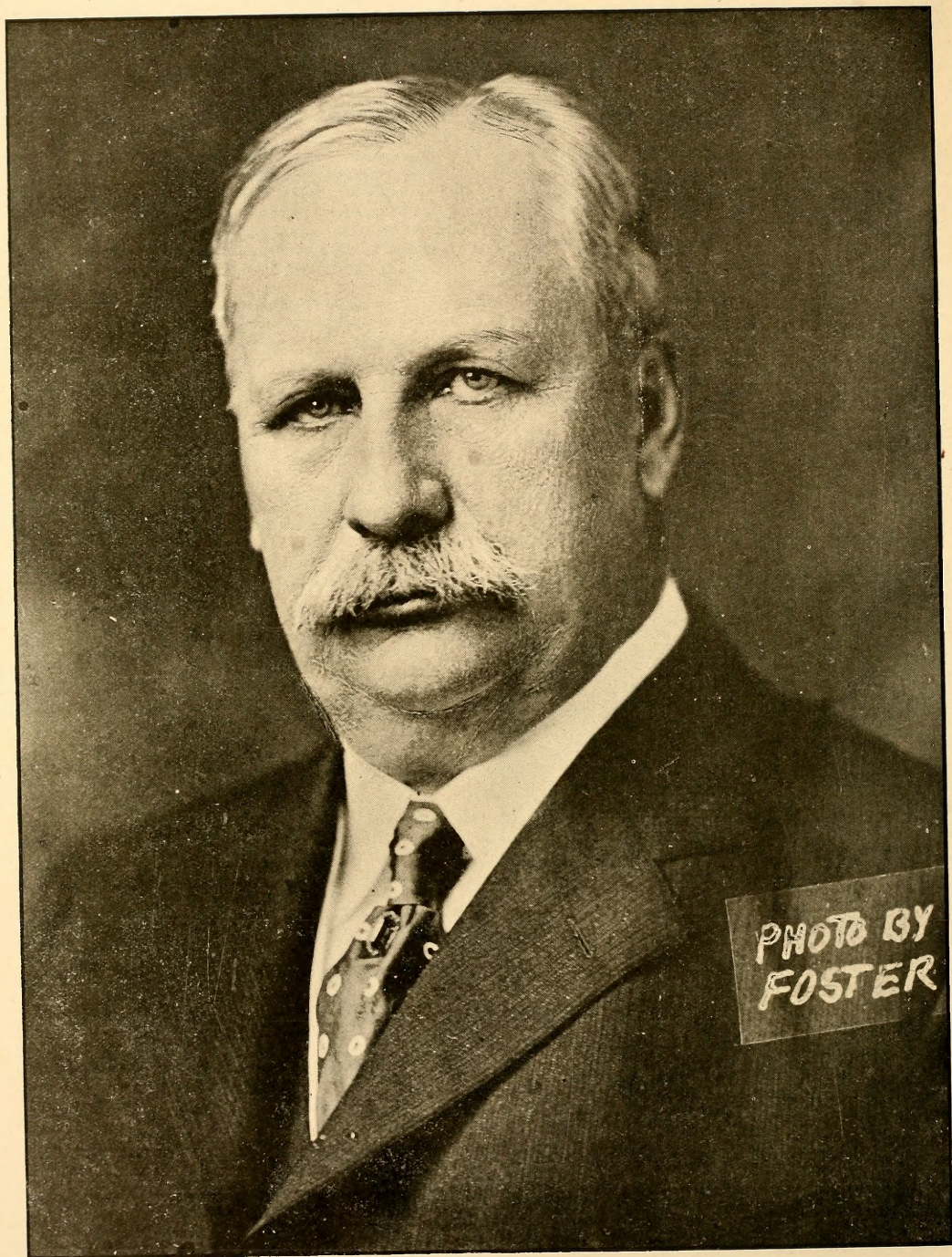
lie M. James are working for the cause; Oscar Underwood will lend his assistance; congressmen from numerous states have made known their willingness to sup-

The Temple Good Roads Association, with headquarters at Temple, Texas, has the right spirit. There is a hard fight on in Bell county for a bond issue for roads and opponents of the bond issue have been spreading the report that Temple, the biggest town in the county, was planning to "hog" the proceeds of the issue. The majority of the members of the association are citizens of Temple. To set things right they issued a statement setting forth the following fair proposition to the citizens living outside of Temple:

"Select your own men and go to the county commissioners and agree among yourselves where the eighty-odd miles of roads shall be built in the country. All of the funds will be available for the construction of your roads first, and then if there is any left we get our pro rata, or as much thereof as is left, to spend on the roads inside the corporate limits of Temple—we make you this liberal offer notwithstanding we of Temple pay 52 per cent or considerably over half the money."

Fair enough and then some!

Mr. William H. Kershaw, Assoc. M. Am. Soc. C. E., Chief Engineer, Paving and Roads Division, the Texas Company, New York City, on January 9th delivered an illustrated lecture on "Commercial Mining, Transportation and Storage of Asphaltic Oils" before the Graduate Students in Highway Engineering at Columbia University.

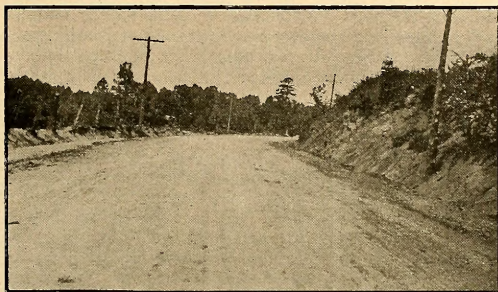


GOVERNOR H. C. STUART, OF VIRGINIA

Governor H. C. Stuart Indorses Virginia's Road Policy

Hon. H. C. Stuart, Virginia's new governor, who went into office without opposition, either in the democratic primaries, or in the general election, indorses the road building policy of his state and promises to take an active interest in her road problems. In his inaugural address, delivered before the Virginia legislature and thousands of patriotic citizens assembled to see him inducted into office Monday, February 2, he had this to say about roads:

The co-operation of the state with the counties in the matter of road building, having passed the experimental stage, may now be considered as a fixed policy. The roads already built afford in themselves conclusive evidence of their value. In this day roads afford an index to the character of the community, and largely



A section of the beautiful Yanceyville road in Pittsylvania county, Virginia.

measure its advantages and consequent attractiveness as a home.

Not only do they afford the means of greatly cheapening a very important and long neglected part of the transportation charges on all incoming and outgoing traffic, but also the means of intercommunication, neighbor with neighbor, which adds so much to the pleasures and advantages of rural life, and restores to it the comforts and conveniences to which it is justly entitled, and the lack of which is largely responsible for the much deplored exodus from the farm.

They supply also the feature of accessibility to schools and churches, which is essential to the highest enjoyment of the privileges and benefits of these, the sources of the life's blood of our civilization. With these blessings in view we should not halt in the good work which in most sections of Virginia is just begun.

We should not, however, allow our enthusiasm for good roads to obscure the practical side of this very practical subject. States and communities, just as individuals, can live beyond their present means; the fact that excessive expenditure is in the right direction is only a mitigation and not a justification.

My observation has been that the average taxpayer exercises much more energy and zeal in voting a large bond issue on his county than in co-operating with the State and local authorities in safeguarding the resultant funds from extravagance, negligence, mismanagement and misappropriation, or in preventing the loss of the investment by failure to keep the roads so built in repair.

In a future communication to the General Assembly I shall venture to recommend some changes in the present system in the direction of efficiency and economy in construction, and a greater adaptation of plans and specifications to the needs of isolated communities where expensive roads cannot be justified, but where substantial improvement is nevertheless practicable and attainable.

Planning for Efficiency in Road Building.

All officials in direct charge of the roads of the various states will be appointed instead of elected, the civil service system will be applied to all minor officials, road taxes will be collected in cash instead of being worked out on the roads by the farmers, and general state control of roads, rather than local control, will be evolved, if the plans of the joint committee of the American Highway Association and the American Bar Association are brought to a successful conclusion.

A comprehensive program for improving the system of road management in all the states was mapped out at a meeting of a committee of the American Highway Association and representatives of the American Bar Association in New York within the past few days. The committee of the American Highway Association is composed of P. T. Colgrove, president of the Michigan Good Roads Association, an affiliated organization; A. N. Johnson, State Highway Engineer of Illinois; J. E. Pennybacker, executive secretary of the American Highway Association; and A. B. Fletcher, State Highway Engineer of California.

This committee conferred with Frederick E. Wadhams, chairman of a special committee appointed by the bar association to take action on the subject of uniform highway laws, and with Charles Thaddeus Terry, chairman of the standing committee of the bar association on uniform legislation.

As the first step in the program for uniform highway legislation, it was determined to obtain the assistance of the government office of public roads and all the state highway departments in the preparation of a complete literal compilation of all laws on the subject of roads. It is not the intention of the committees, which are working together as a unit, to make a digest of the laws. The statutes of the different states will be recorded in their entirety and when the compilation is completed the governors of the various states will be asked to request the legislatures to appoint committees to meet with the officials of the American Highway Association and the American Bar Association. The laws of the various states will then be at hand for comparison and correlation.

Certain basic principles will be recommended for enactment into law by all the states, such as the establishment of non-partisan boards which will select all engineers in direct charge of roads with a view to removing the chief road officials from politics. It will also be recommended that the road chiefs be selected for periods determined by their usefulness, rather than any set term of years. Aside from the basic principles, which it is believed will provide general efficiency in all the states, the legislators of the different states will be asked to evolve from the compilation of laws such legislation as will be best adapted to the needs of their own state, with an eye to nation-wide uniformity.

The Labor Problem in Road Construction

By P. ST. J. WILSON

Asst. Director U. S. Office of Public Roads, Former, State Highway Commissioner of Va.

MOST of the problems in connection with labor in road work are identical with those in other similar work, and are familiar to all who are accustomed to handling labor. I therefore feel that I can be of little service in laying before you my troubles in this connection, having only a partial suggestion as to the remedy.

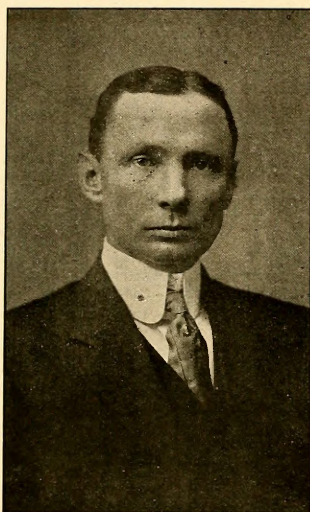
Road work, in order to get the best results, requires a certain amount of skilled labor, and also a certain amount of skill in all the labor used. The men who cut the ditches, shape the road bed and do almost any other work, can materially aid the progress by doing skillfully the work to which they are assigned. The

tation of labor, parties in the neighborhood, even farmers interested in the road, have taken the labor away by offering higher wages than we were justified in meeting, considering the price of labor locally and generally throughout the state. With us there are few contractors equipped for road work, and although we always advertise for bids on our work, we often have no bids at all, and still more frequently, the bids are so high that we are forced to reject them, and the consequence is that much work is done directly by the commission. During last August one hundred and thirty pieces of work were under way at the same time, scattered over sixty counties, and only twenty-eight of this number were under contract. To supply the necessary number of competent foremen and operatives, as well as laborers for these various pieces of work, has been probably the most difficult task we have had to contend with. On account of the small amount of funds available, many of the jobs last only a few months, the majority not continuing through the usual out-door working season, which in our state is from eight to ten months, and but few of them last throughout the year. Where the work is of short duration, we, of course, so far as practicable, use one organization on two or more pieces of construction, but notwithstanding this, we are forced to the necessity to a certain extent of reorganizing our forces each year. We endeavor, as far as possible, by transferring the best men to the longest jobs, to keep a nucleus of foremen and operators from year to year. Sometimes, where it is practicable, we use the county superintendents or foremen in our state work, but it is generally the case that these men are occupied with the county work at the time we could use them.

As to the common labor, we have found it necessary to practically build up a new force annually in each county, though we frequently get back some of the local men we have used the year before.

This is, in brief, the labor situation as we have it in Virginia today, and there are doubtless other states contending with more or less similar conditions. The solution of the problem has not been reached fully by us. As to what we may call the skilled labor, time has helped us much and we have a certain number of trained foremen and operatives which is increasing from year to year and which will in time, I hope, be sufficient to meet the demand, notwithstanding the fact that we lose some of them every year on account of the irregularity of the work. But I must express the hope that in what has proven so far our nearest solution of the common labor problem, we shall never have enough men to supply our demand. Otherwise there must be a great increase in crime. So far as they are available, the convict practically solves this problem for us—with them we have no pay day drunks, no strikes, except now and then an escape, and many of the irregularities connected with the attendance of the free labor are avoided.

There are at work on the roads of Virginia about fifteen hundred convicts. They are divided into forces varying in numbers from forty to seventy-five, according to the class of work they are engaged in. Altogether, there are twenty-seven of these forces, each in a different county. While we may have some labor problems with these, the chief one is eliminated on the work on which the convicts are placed, viz: that of keeping

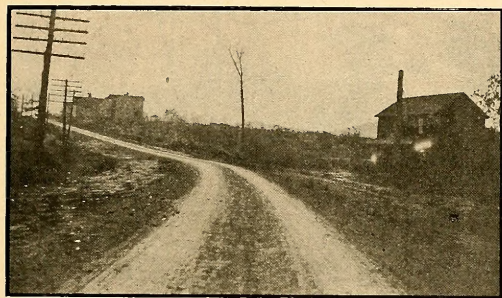


CAPT. P. ST. J. WILSON

Assistant Director U. S. Office of Public Roads, former Highway Commissioner of Virginia.

real labor problem, as I have found it, is to secure regularly the amount of skilled and common labor necessary to carry on the work economically. My case is probably an extreme one. In Virginia most of our work has been remote from the cities, in sparsely settled communities, where they are few laborers without more or less regular employment; yet the work is so scattered that many of the pieces are too small to justify importing laborers from any considerable distance and making provision for their maintenance. We have therefore been compelled to rely largely on local labor, and are often seriously handicapped. Not infrequently has it happened that we have been compelled to shut down work for a month or more during the best road building season, while the labor went to harvest the crops in the neighborhood. When you are told that our joint state and county fund in a few counties is as small as \$1,200 per year (ranging from this up to about \$20,000,) it may readily be seen how little work can be done in some places. In a number of instances, where the amount of work was sufficient to justify the impor-

a sufficient amount of labor. We are better able to keep good foremen on these jobs also, because they are kept going all the year round. While as a matter of economy we have to close down free labor work during the severe weather of winter, we find it economical to keep the convict work going on continuously, as the men have to be cared for whether at work or not. Certain classes of work can be found to be done in winter, such as quarrying and heavy rock grading in mountainous sections of the state and in the lower sections where no stone is available, the climate is milder and sufficient work can be done to justify the additional outlay for working when both men and teams have to be cared for in any event. In January of this year 72% of possible working days was made, while in July 90% was made. These percentages are based on an eight hour day in January and ten hour day in July. Among the convicts we not infrequently find men capable of running steam rollers, engines, drills, etc., and a large percentage are made trustees and used as teamsters, messengers, etc. The average cost of the convict labor per ten hour working day for the past 3 years has been fifty-two cents, as compared with wages ranging from



Limestone macadam road near Campbell C. H., in Campbell county, Va., built during December 1910.

\$1.25 to \$1.50 for free common labor. To offset this discrepancy in cost to some extent, there are some disadvantages in working convicts, the chief one of which is the necessity of keeping them always immediately under the eye of the guard, thereby in a measure crippling their usefulness; sometimes, too, partially crippled men or semi-invalids are sentenced to the roads, which reduces the general efficiency of the force. Notwithstanding these handicaps, however, those foremen and contractors who have worked convicts under our system very generally express a preference for them over free labor, and I am satisfied they are fully ninety per cent as efficient as the average hired labor. Recently we have had voluntary applications from three contractors for convict labor to be furnished to them and charged on their estimates at \$1.00 per day per man, which is the established rate when this labor is used by contractors. All felony convicts, not considered too dangerous, and all inmates of the jails are subject to duty in the state convict road force. This force is fed, clothed, guarded and transported at state expense and is furnished to the counties on the requisition of the State Highway Commissioner as one form of state aid, and is worked under the supervision and direction of the highway commissioner. Under our statutes the convicts are at all times, whether working for contractors or otherwise, under the supervision and control of the state prison authorities, which insures the proper food and treatment and eliminates the possibility of the

many cruelties which have been reported in connection with prison contracts in the past. The men are worked in the open, well fed and housed in sanitary quarters, with the result that they are greatly improved physically and capable of earning a living when discharged.

After a close study of this question and seven years' experience in the work, I am convinced that so far as they are available, the use of convicts in road work under conditions as we have them in Virginia solves the problem of labor in road construction and also goes far towards solving the problem of what to do with our convicts.

Automobile Manufacturers Should Aid Southern National Highway.

It has ever been thus—

"He that hath to him shall be given; and he that hath not, from him shall be taken even that which he hath."

During decades, the southern states have been poor and under limitations.

The manufacturers of automobiles have sold automobiles, and derived profits therefrom, throughout the entire country. Hence, the accumulation of profits includes money paid over by the southern people. This accumulation is evidently large; for it has been announced that the automobile manufacturers propose to contribute a few million dollars toward the construction of a transcontinental highway across the northern states. If this is carried out, the transaction will involve giving to the northern states, which are already rich, money received from the people of the southern states, who, as above stated, are not favored with riches and have been under limitations. This clearly makes a case to which the above quotation is applicable.

The northern states are entitled to their project for a transcontinental highway.

The southern states are entitled to a similar project, and they have such a project—the proposed Southern Highway which is to extend from Washington, D. C., through Virginia, North Carolina, Tennessee, Arkansas, Texas, New Mexico, Arizona and California.

May I not, being a native of one northern state and having been reared in another northern state, urge that the generous and equitable course for the automobile manufacturers will be to divide their contributions, for this purpose, between these two transcontinental highways in proportion to the trade they have had in the two sections of the country. I think it may be assumed that large numbers of northern people would say that such a division would be fair and just.

The south need feel no hesitancy regarding the acceptance of such contributions to their highway project. A portion of the accumulations in the hands of the automobile manufacturers came out of the pockets of the southern people, and if there is to be a distribution back to the people, it is appropriate to return proportionally to the southern people.

—Cyrus Kehr, Knoxville, Tenn.

Col. J. W. Howard, Consulting Engineer, New York City, on January 24th delivered an illustrated lecture on "European Rock Asphalt, Obtaining, Preparation and Uses" before the Graduate Students in Highway Engineering at Columbia University.

McLennan county, Texas, one of the most progressive counties in the Lone Star State, will hold an election on the 14th of this month to vote on a bond issue of \$1,075,000 to build additional good roads.

Road Construction in Massachusetts With Refined Tar

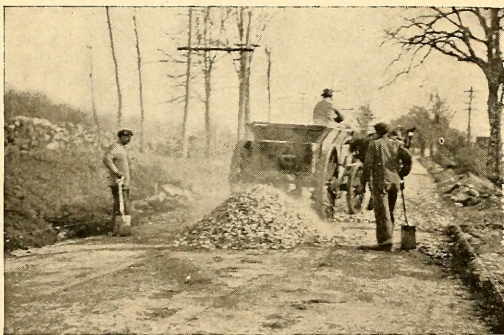
By PHILLIP P. SHARPLES

THE State Highway Commission of Massachusetts has used bituminous binders with a tar base since 1907. A survey of the work done, beginning at Wayland and at Norwood with surface coatings, leads down



Plant for crushing stone. Field stone of granite and trap-rock were used for all courses

through a large number of experiments in road construction with varying amounts of binders and various sizes of stone, to the present thorough construction now being practiced on the main traffic routes. During the present season, a large amount of work has been



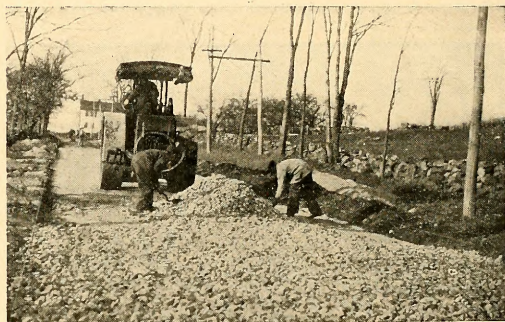
Dumping stone for top course. Note the base sand filled and well consolidated by rolling. The stone for the course is dumped on board platforms and every stone rehandled before placing in position. This insures an even riding and even wearing road

done on the Worcester-Providence trunk line. Sections have been let in Grafton, Northbridge, and at Blackstone. The work at Grafton is typical of this form of construction.

Much attention is given to the preparation of a proper base for the bituminous top proper. Previous work has shown that it is very essential to have a firm, unyielding base, if the top is to endure. Even with the early surface treatments the character of the foundation had much to do with the lasting qualities of the coating. At Norwood, where the base was firm and the macadam road in good condition, the surface coating endures to the present day with only renewals and

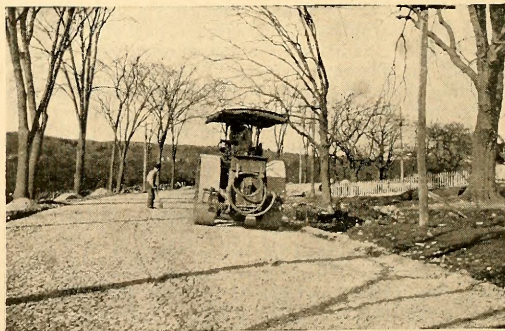
patching, while at Wayland where the base was less firm and the macadam in poor condition, the road required constant recoating and was so unsatisfactory that reconstruction work was begun last year.

At Grafton new culverts and new drainage work were carefully planned to take care of all surface water and to intercept all under ground water where it had a tendency to run from hillsides underneath the road. The foundation was then levelled off and after rolling with a roller the base course of stone was put on, using four inches of crushed stone (passing a $2\frac{1}{2}$ inch ring and retained on a $\frac{1}{2}$ inch ring.) This course was thoroughly rolled with the steam roller and then



Spreading top course and rolling base, Nov. 18, 1913. The stone for the top course is carefully spread by hand

bound in with a good binding gravel. After the base was complete it could be favorably compared with an ordinary macadam road. Over this thoroughly built base, a layer of stone passing a $2\frac{1}{2}$ inch ring and re-

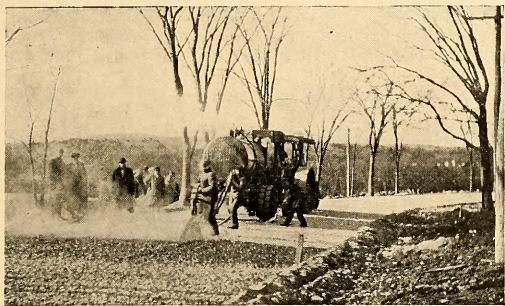


Rolling wearing course preparatory to Tarvia X coat. The road is rolled until the surface is smooth, even and closely packed

tained on a $\frac{1}{2}$ inch ring was used, making a depth of 2 inches when rolled.

The use of large stone in the wearing course of the road is an innovation of the last few years in road building, but the results obtained seem to fully bear

out the theory. With a water bound macadam it is necessary to fine up the stone on the top in order to get it to stay in place. The same, however, is not true of a bituminous bound macadam, since the bituminous binder is able to hold the largest stone in place during the



Spraying Tarvia X—1-2 gallons to yard. The Tarvia was delivered hot by auto truck and sprayed on with a single atomizing nozzle. Pressure is furnished by the roller

construction of the road and subsequently under traffic. The large stone has the advantage of a better resistance to wear, since it has not already been pulverized by the crusher, and also of transmitting the load to better advantage to the foundation. In using the larger stone, it is essential, however, that the bituminous binder should be so distributed and the subsequent



Putting on clean peastone or 3-4" stone over the Tarvia X. Only enough stone is used to chink up the surface soil and prevent the roller from sticking

layers of finer stone should be so placed, so as to insure a thorough bonding of the larger stone.

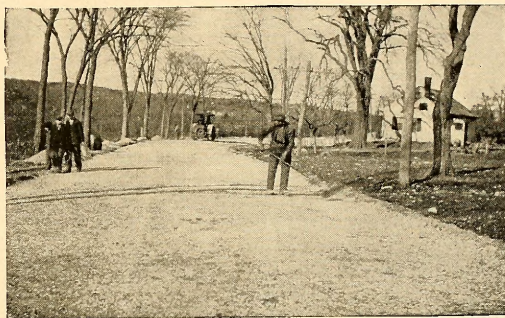
After the 2 inch wearing course has been thoroughly rolled and smoothed out, it is ready for the refined tar binder. The stone used at Grafton was a species of granite, which, under the roller, produced enough fines by breaking up the large stone to lock them thoroughly together.

In the case of a very hard trap rock, it is necessary to supply a layer of stone crushed to the proper size to hold the larger stone in place and get the desired surface for putting on the binder. A thin layer of stone sized to pass a $1\frac{1}{4}$ inch screen and to be retained on a $\frac{3}{4}$ inch screen is usually the right size for the purpose.

The refined tar binder was delivered to the Grafton

road by the Barrett Manufacturing Company in auto trucks and on the lower course was of the Tarvia X grade. It was sprayed on through a single atomizing nozzle attached to a single hose under a steam pressure of 20 pounds to a square inch taken from the steam roller. The binder was delivered hot from the works of the company situated at Everett, Mass., 45 miles from the job, and in spite of the distance was always in condition to begin spraying immediately on arrival of the truck.

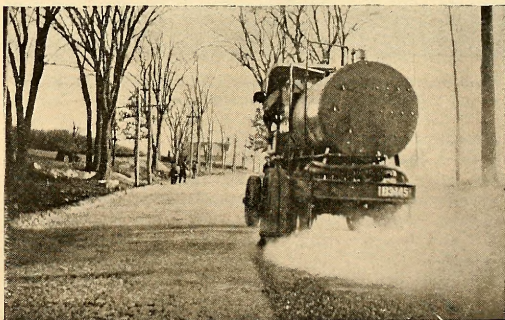
Great care was taken to spray the binder on evenly and the best possible man on the work was chosen for this purpose. No drainings from the tank at the end of the job were permitted to go on the road and also it was made sure that the nozzle was spraying properly before any of the binder was allowed on the road. The



Showing the road rolled ready for seal coat. Any excess of peastone is swept off

result of this careful attention to details is shown in the completed work. The surface is uniform from end to end and the road is of perfect riding quality even in an auto going at a high speed.

A gallon and a half per square yard of the Tarvia X was used. Workmen followed at once throwing on a very thin layer of clean peastone ($\frac{1}{4}$ of an inch to $\frac{1}{2}$



Spraying Tarvia A seal coat 1-2 gallon to square yard. The Tarvia is delivered hot in auto trucks and sprayed on under pressure given by a rotary pump geared to the motor of the truck

of an inch.) Care was used not to make any very distinct layer of this stone, but enough was applied to thoroughly chink in the surface and to keep the steam roller from sticking. As soon as the tank load of binder had been distributed, the roller was put on the road to smooth out the surface and thoroughly consolidate the wearing course.

After this thorough rolling, the surface was ready

for a seal coat. This was generally delayed for several days until sufficient area had been obtained to take a whole truck load of bituminous material. For the seal coat a Tarvia A grade was used, since experience has shown it to give slightly better results than Tarvia X, which is more generally used for this purpose. Tarvia X is, however, still used when the binder is delivered in tank cars, since it is then difficult to so regulate the work that the two grades can be used at the same time. With auto trucks, however, the combination of the two grades is easily planned for.

An example of the use of a Tarvia X seal coat is to be seen on this same road at Blackstone where the Tarvia was delivered in tank cars heated by a steam boiler alongside of the work and put on from a uniform distributor.

The seal coat on the Grafton work was sprayed on from a pressure distributor attached to the truck. The distributor consists of a rotary pump geared to the driving shaft of the motor and delivers the hot tar to the spray nozzles at a pressure of 35 pounds. The resulting spray is extremely uniform and with the truck at the lowest speed gives approximately $\frac{1}{2}$ of a gallon to the square yard. With the road ready, the truck can spray on 1200 gallons of seal coat in 30 to 40 minutes. Men follow closely behind the sprayer, spreading clean peastone over the seal coat. The roller follows in order to insure a thorough incorporation of the



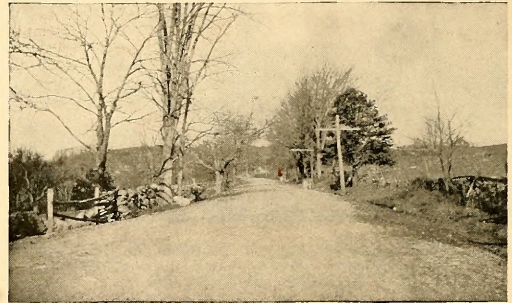
State Road, Grafton, Mass. Putting on peastone over Tarvia X-seal coat. The road is rolled again and is then ready for traffic

peastone in the seal coat. As soon as the roller has finished, the road may be opened to traffic without further delay. This is a great advantage where it is impossible to turn the traffic aside except for short intervals. Roads built under these specifications are showing up exceedingly well with the Massachusetts state road traffic. They are smooth, very agreeable to ride upon, can be used as soon as finished, and give a low cost of upkeep through a long period.

The method of maintenance consists of surface applications of bituminous materials as required. Thinner grades of tar binders have proved very successful for use over tar bound macadam roads. For this purpose thinner grades of refined tars are used, such as Tarvia A and Tarvia B of the Barrett Manufacturing Company. Roads treated in this way show extremely low cost of maintenance and are always in good condition, both in summer and winter. Good examples of this method of maintenance are seen at Westminster, Mass., and at South Walpole, Mass. Both roads were built in 1909, and have required but a single surface coat, since the original work was completed. The seal coat was

put on at a cost of about 8c. per square yard, making the total maintenance cost per square yard on these roads for a period of four seasons very small.

With the modern type of distributors the costs of surface treatment have been very much reduced, so that the maintenance of this type of road becomes a very easy problem. This method of construction and maintenance also fulfills the new requirements for auto truck traffic. The firm, strong base and the well bound top



Finished Road

are capable of upholding the heavy loads imposed by the auto truck, while the surface seems to be proof against all ravelling brought about by the shear produced by the tractive effort of the driving wheels of the truck.

The wisdom of the recent work with tar binder in Massachusetts is upheld by a comparison with recent work in England. The motor truck problem is much more acute in England than in the United States, since the trucks were earlier in the field and have multiplied much more rapidly in proportion to other traffic on the road. In response to the need, many miles of tar bound macadam have been built in England during the past four or five years. Reports of the condition and behavior on these tar bound roads brought back by delegates returning from the London Road Congress, show that they are standing up admirably under the heavy duty imposed upon them and giving good satisfaction.

It is not often that good roads put a railroad out of business but the Little Rock, Arkansas, Gazette notes that the England and Clear Lake Railroad Company has filed with the secretary of state a petition asking that it be permitted to surrender its charter. The petition says that the road is now paralleled by one of the finest pike roads in the state of Arkansas, and that it is receiving no revenue whatever except from what lumber is shipped from one of its mills, known as the Keo Shingle Company, which owns and holds all the stock of the railway company.

Mr. William H. Connell, Assoc. M. Am. Soc. C. E., Chief, Bureau of Highways and Street Cleaning, Philadelphia, Pa., on January 15th delivered an illustrated lecture on "Organization and Methods of Street Cleaning Departments" before the Graduate Students in Highway Engineering at Columbia University.

Washington county, Tennessee, will vote February 28 on a bond issue of \$415,000 for road building. It is planned to grade and surface with this amount 160 miles of roads.

Sub-Organization For Securing Efficient Maintenance

By JOHN N. CARLISLE

State Highway Commissioner of New York

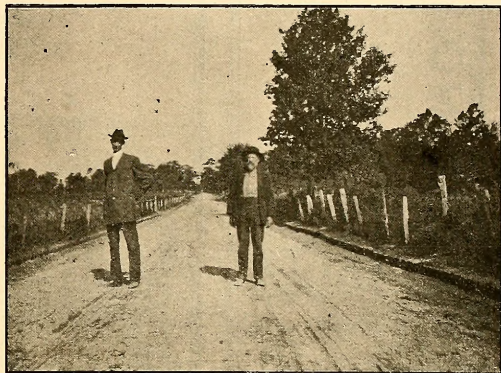
THE really great problem confronting those who are in charge of state departments of highways is maintenance. This question involves not only a study of the methods to be adopted for properly keeping the roads in repair, but first involves the question of what scheme of organizing a department can be installed to procure such a result.

In New York state up to this year the construction of highways was under the charge of division engineers, and the maintenance work was separate and apart and was in charge of a maintenance bureau under different divisions and superintendents of maintenance. This plan of divided authority was so unsatisfactory that in the winter of 1913 the legislature of New York provided that the work of construction and maintenance should be consolidated under the control of the division engineers, and that the work of maintenance should be done either by contract or directly by the department.

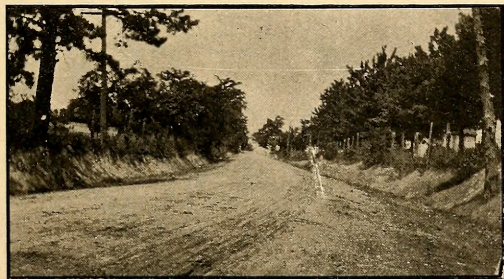
Our state is divided into nine divisions, with a division engineer in charge of each, and we intend to subdivide each of these divisions into about seven subdivisions, making sixty-three subdivisions of the state. In charge of each of these subdivisions we intend to appoint an assistant engineer, and put him in charge of both construction and maintenance in his territory, requiring him to have an office and live therein and to hold him rigidly responsible for the condition of his roads.

The New York plan in the past has been to rely largely upon patrolmen, that is, the placing of a man with

we believe that in following the methods of the steam railroads in taking care of their tracks we can accomplish better results than in any other way. This problem, of course, means the organization of a proper section gang with equipment sufficient to do repair work. Our plans call for the furnishing of an automobile truck, pressure sprayer oiler, a steam roller, and heat-



Gravel road in Northampton county, North Carolina, built under the supervision of W. W. Stone, Engineer U. S. Office of Public Roads, the tall man in the picture. The other man is Mr. John W. Moore, chairman of the road commission of Northampton county



A view of the Yanceyville road, Pittsylvania county, Virginia

a horse and wagon in charge of a small number of miles, and imposing upon him the duty of keeping his section of the road in repair. With a state so large as New York, this plan has not worked out to our satisfaction, and while we do not believe in entirely abandoning the patrol system yet we are arranging for an organization of section gangs in each of the subdivisions, each section gang to be furnished with equipment with which roads can be oiled and repaired.

No railroad company today would think of trying to keep its tracks in repair simply by a patrol system, and

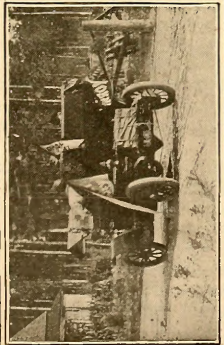
ing tanks, together with small tools, so each section gang will be large enough and well enough equipped to properly repair any kind of road already constructed.

With section gangs properly organized, and with sufficient equipment under the direction of an engineer who is held responsible, we ought to produce a sub-organization which can give efficient maintenance. This section gang should be organized strong enough to clean and oil the roads at the proper season, make temporary repairs, and when this preliminary work is done, do heavy permanent repairs to our roads.

The Fox River Valley Highway association was organized at Appleton, Wis., last month with John Conway of Appleton as president, to build a seventy mile concrete road at a cost of \$1,000,000 from Fond Du Lac to Green Bay connecting the cities of Oshkosh, Neenah, Menasha, Appleton, Kaukauna, Repere Green Bay. More than 50 cities and villages are represented.

The commissioners of Sumter and Crisp counties, Georgia, are still negotiating about the construction of a bridge across Flint river. It is estimated that the bridge will cost between \$15,000 and \$18,000.

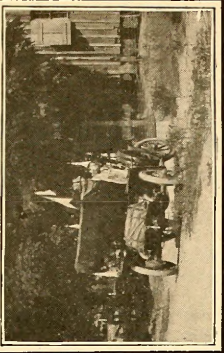
The town of Yoakum, Texas, votes this month on a bond issue of \$50,000 for street improvement.



· NEW · EDITION · OF · THE · NORTH · · & SOUTH · MAP ·

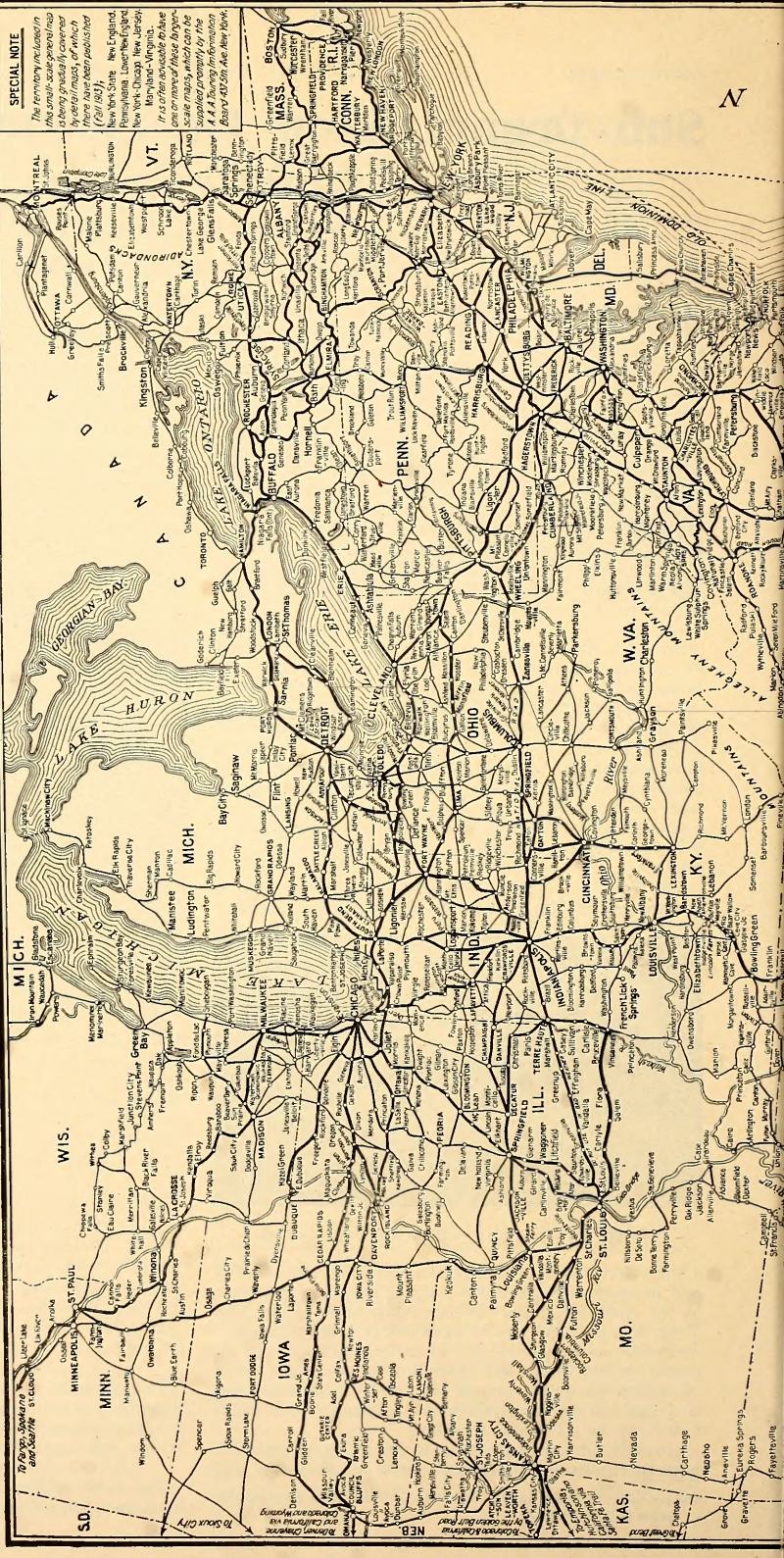
THIS is a much reduced fac-simile of the new North and South map just published by the A. A. Touring Bureau. Its purpose is to show the main traveled routes between the North and the Central-Western States and the South in their correct geographic relation. Many of the roads shown on this map are undergoing rapid changes and from time to time will be subject to

correction. The map itself is, however, the best general reference work to date; copies more than twice the size of that reproduced below, with a number of city maps on the reverse, and printed on heavy bond paper to withstand hard usage on the road will be sent postpaid on receipt of 50 cents by the A. A. Touring Information Board, 437 Fifth Avenue, New York City.



· IN · GEORGIA ·

· A · SOUTHERN · TOLL · GATE ·





ROUTES BETWEEN THE NORTHERN STATES MIDDLE WESTERN STATES AND THE SOUTH

Scale of Miles
0 50 100 150 200

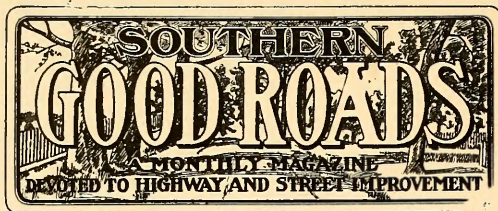
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Note:
The heavy lines represent
main arteries of travel—not
necessarily the best-surfaced
roads throughout, but the best
for through trips, considering
distance and speed in condition.

Route & Map Service
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G.W.A.



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C. B. SCOTT, President, Lynchburg, Va.
C. L. SCOTT, JR., Secretary, Harrisonburg, Va.

VOL. IX. FEBRUARY, 1914. No. 2.

THE VIRGINIA ROAD BUILDERS' ASSOCIATION.

The Virginia Road Builders' Association, which meets in annual session in Richmond, Va., February 10 and 11, is a fine, progressive, growing organization. There is no dead timber in it, as is the case with many older and larger road organizations, and the annual meetings, of which this is the fourth, are marked by a zeal and earnestness that is seldom found in such gatherings.

The main reason for this may be found in the personnel of the body. The association is not a body of dreamers, of empty boosters, or of theoretical road experts. Its members are actual road-builders—men on the job as county highway engineers, engineers working under the state highway commission, road supervisors out in the field, road commissioners in the various counties of the Old Dominion, and county supervisors, who have to do with problems of road building and maintenance.

These men attend the association's annual conventions with the view of getting something out of them that will aid them in their work at home and that is

why there is no "foolishness," no spread-eagleism, no hot air, about their conventions.

The president of the association, Mr. C. B. Scott, recently elevated to the position of Assistant State Highway Commissioner, writes Southern Good Roads that a great convention is in prospect. A larger attendance of delegates and visitors is expected than ever before in the history of the organization and the program will be an unusually fine one.

Southern Good Roads is the official organ of this association of practical road men and is very proud of it. We are looking forward with pleasure to the Richmond meeting.

A GOOD SUGGESTION.

In this issue Mr. Cyrus Kehr, of Knoxville, Tennessee, head of Governor Hooper's highway commission, and one of the leading good roads enthusiasts of the South, offers a suggestion that is worthy of attention.

He suggests that the wealthy automobile manufacturers of the nation who are contributing their millions to the Lincoln Memorial Highway fund, might be induced to contribute to the building of the Southern National Highway, if the matter were brought to their attention in the right way.

Mr. Kehr does not ask that the manufacturers allow the Lincoln Highway project to go begging in order that the South may get her highway, for he recognizes the fact that the north is entitled to the highway and that it should be built. He would have them go further and raise a fund to help build a Southern highway as well, because the South is doing her part to help swell the fortunes of the automobile manufacturers.

If the manufacturers share profits with our brethren of the north, they should also share profits with the South, at least in proportion to the amount of trade the South has given them. The South today offers the greatest field for the automobile manufacturer on earth and the big automobile business of the future is going to be done in the South.

We have been too poor to keep pace with the people of the north and west, but that time has already passed. We are giving automobile makers a tremendous business now and much bigger business is in prospect. The manufacturers should get behind the Southern National Highway, just as they have gotten behind the Lincoln Highway project.

CAPT. P. ST. JULIEN WILSON.

Captain P. St. Julien Wilson, highway commissioner of the state of Virginia for a period of six years, has been made assistant director of the United States Office of Public Roads, and is second in command of the road-building forces of the nation.

Captain Wilson did great work in Virginia. He was the first head of the state highway work of Virginia and he built up an aggressive, result-producing organization under big difficulties. There was never a time when his department had money enough to do its best

work, but in spite of that he reached nearly every section of the state and today there are object-lesson good roads in almost every county of the Old Dominion.

In his new position Captain Wilson will make Hon. Logan Waller Page a valuable assistant and his friends in Virginia and elsewhere are expecting great things of him. Captain Wilson has been a frequent contributor to Southern Good Roads and in this issue appears a paper read by him before the Detroit meeting of the American Highway Association.

Virginia is fortunate in being able to replace Mr. Wilson with an official who has already proved his worth, Mr. G. P. Coleman, who has been Mr. Wilson's assistant since the beginning of his term six years ago. Mr. Coleman is familiar with every detail of road work in Virginia and he well deserves the promotion that has come to him.

To Mr. Coleman's place, Mr. C. B. Scott, assistant highway engineer, with headquarters at Lynchburg, Va., has been appointed. Mr. Scott is president of the Virginia Road Builders' Association and he has been in charge of highway work in southwest Virginia, where he has made a fine record.

Southern Good Roads wishes these able Virginia road-builders an abundant measure of success in the larger fields to which they have been called and will watch their careers with interest.

Growth of the Convict "Honor System."

The practice of putting convicts on their honor, especially prisoners who are at work constructing or repairing highways, has been started in several states and is meeting with much success, according to reports received by the National Committee on Prison Labor. North Dakota, Oregon, New Jersey, Michigan, Ohio, and Colorado are among the states where the honor system has been developed to its highest degree.

Under the laws of North Dakota, the Board of Control may employ convicts on the public highways, their expenses to be paid by the respective counties in which they work. The law stipulates that the prisoners perform their duties under the supervision of skilled laborers, who act as guards; but, so far as possible, the law declares, the convicts are to be placed on their honor.

Another feature of North Dakota's prison laws is worded as follows: "Each short-time convict worked upon said estate roads shall receive a credit upon his time of 10 days for each 30 days that he shall faithfully and diligently work upon said state roads, and in case of convicts serving life sentences, such privileges shall be given them as in the judgment of the warden is proper, but in case that any convict fails to do faithful and efficient work or attempts to escape, he shall forfeit all or as many of said credits as in the judgment of the warden shall be proper."

Of 275 convicts who were worked under the honor system in Ohio, only 18—less than seven per cent—attempted to escape, according to the report of Warden Preston E. Thomas of the Ohio State Penitentiary. While these men were thus employed, there was no barrier except their own honor between them and freedom. Of the 18 men who broke faith, all but seven were caught and returned to the prison, so that the percentage of those who failed to serve their full sentences was only two and a half. This record, says

Warden Thomas, compares favorably with trusts in the outside world.

Also in Michigan, where all persons convicted of drunkenness or vagrancy are sentenced to work on the roads instead of to jail, the practice of trusting prisoners has been found successful. Not only that, but, according to W. M. Bryant, Good Roads Commissioner of Michigan, the sentencing of convicts to work on the highways tends to eliminate much petty crime.

It was in Colorado, under Warden Thomas J. Tynan, that the honor system was first employed among prisoners at work on the highways, and it is in that state and Oregon that the system has been most extensively developed. Governor West, of Oregon, in a statement to the National Committee on Prison Labor concerning the honor system among prisoners at work on the roads, said:

"Our road gangs are made up of from 15 to 25 men, with a free man as foreman, who lives and works with his crew. His word is law in camp, and his report as to conduct of the prisoners carries great weight with the prison officials. It is most essential, therefore, that great care be exercised in the selection of these foremen. We have had unexpected success in the operation of our road gangs. Some have been maintained as far as three hundred miles from the prison and nearly all in the hills and mountains, where every opportunity was given to escape. At first we lost a number of men, due largely to the novelty of the plan and unjust newspaper criticism which made many of them fear the abandonment of the policy and their return to prison. There has been less newspaper criticism of late, and the public, seeing the merits of the system, is accepting it as a settled policy."

The voters of Los Angeles county, California, are wrestling with a bond issue of \$1,750,000 for the building of a system of paved highways reaching to every section. It will include 168 miles of paved road and 245 miles of dirt road reaching from the Cajon Pass to Needles on the Colorado River at the extreme eastern end of the county. The roads laid out for the west end of the county constitute a complete system leading from town to town in all directions. It is planned to get all the main arteries of this system completed by 1915.

Franklinton township, Franklin county, North Carolina, has just completed a program of road improvement and the claim of the township is that it has a road system not surpassed by any township in the state. The claim can doubtless be substantiated. Franklinton has set the other townships in the state an example that deserves to be followed. Good roads are a vital need to the continued progress of the state and the township plan, while not as satisfactory as a county plan, is a good one.

The Robeson Process Company, of Pennington, N. J., has issued an unusually attractive little booklet, whose "purpose is to explain as briefly as possible the nature and action of Glutrin," their powerful road binder. It has eight or ten fine cuts, showing roads treated with Glutrin, among these being the main driveway at the White House in Washington, D. C. The booklet should be in the hands of all road and street authorities.

Spartanburg, South Carolina, is considering the expenditure of \$86,000 for street improvement.

Lincoln county, Arkansas, is asking for bids on the construction of 13 miles of road.

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Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

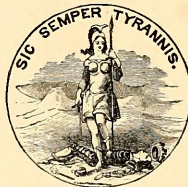
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Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee:

C. L. SCOTT, JR., Secretary



ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

FOURTH ANNUAL MEETING VIRGINIA ROAD BUILDERS' ASSOCIATION.

The fourth annual meeting of the Virginia Road Builders Association will be held in the auditorium of Murphy's Hotel, Richmond, Va., on February 10th and 11th. The association has grown considerably since the third annual meeting in Washington, D. C. in March, 1912. There will be men of all professions present at this meeting and an attendance of at least 800 is expected. Papers dealing with scientific

Secretary; W. I. Lee, County Engineer Tazewell county, Treasurer.

Addresses.

Addresses will be made by persons prominently connected with road improvement in Virginia and adjoining states, on the general question relating to road improvement. Sand-Clay, Macadam and Bituminous Construction will be discussed by experts who have been actually engaged in the several classes of work mentioned. The use of Convict Labor in road construction and road maintenance will also receive attention.

Reduced Railroad Rates.

Arrangements have been made for reduced railroad fares from points in Virginia and the Carolinas. In order to take advantage of these reduced rates, it is necessary to secure standard form certificate receipts from ticket agent when purchasing ticket to place of meeting. Further information can be obtained from the ticket agent.

Hotel Accommodations.

The headquarters of the association will be at Murphy's Hotel, and special rates have been given by the hotel for this occasion.

County and City Officials, Engineers, Contractors, and all other persons interested in road building and maintenance, are cordially invited to attend this meeting and take a part in the discussions.

The complete program is as follows:

FIRST SESSION.

Tuesday, February 10th—10:00 A. M. to 1:00 P. M.

Opening Prayer—Rev. George W. McDaniel, D. D., Pastor, First Baptist Church, Richmond.

Address of Welcome—Hon. George Ainslie, Mayor of Richmond.

"Road Improvement in Virginia."—Hon. G. P. Coleman, State Highway Commissioner.

"Road Building in North Carolina."—Dr. Joseph Hyde Pratt, State Geologist of North Carolina.

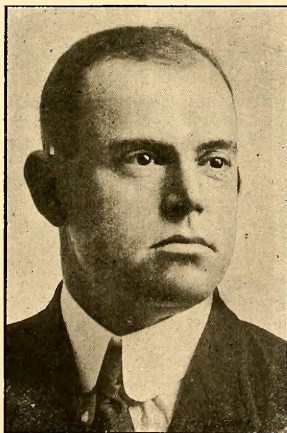
"The Valley Turnpike"—Mr. Harry F. Byrd, President, Valley Turnpike Company.

SECOND SESSION.

Afternoon, February 10th—2:30 P. M. to 5:30 P. M.

"Convict Labor in Road Building"—Mr. James B. Wood, Superintendent, Virginia Penitentiary.

"Road Building from the Contractor's Viewpoint"



MR. C. B. SCOTT,

Assistant State Highway Commissioner of Virginia, President of Virginia Road Builders' Association.

road building will be read and discussed and interesting addresses on matters pertaining to good roads will be delivered by the most prominent officials and speakers of our state.

The object of this association is to stimulate and keep alive the interest in permanent road improvement and maintenance and the association serves a good purpose in bringing together those interested to discuss this important subject.

The officers of the association are: C. B. Scott, Asst. State Highway Commissioner, President; Wm. F. Coker, Asst. Engineer, Vice President; C. L. Scott,

—Mr. Jno. T. McKinney, President, Jno. T. McKinney Contracting Company.

“Brick Pavements”—Mr. H. L. Shaner, City Engineer, Lynchburg, Va.

“Bituminous Construction”—Mr. Chas. S. Reeve, Assistant Chemist, Office of Public Roads, Washington, D. C.

THIRD SESSION.

Wednesday, February 11th—10:00 A. M. to 1:00 P. M.

“Road Building in Southwest Virginia”—Hon. John W. Chalkley, President, Wise County Good Roads Association.

“Effect of Road Work on Health of Prisoners”—Dr. R. C. Whitehead, Physician and Surgeon, Norfolk, Va.

“Road Improvement in Russell County”—Mr. E. S. Finney, Attorney-at-Law, Lebanon, Va.

Reports of Committees.

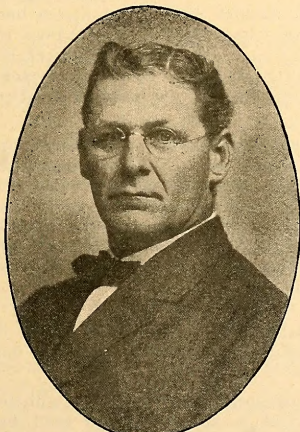
FOURTH SESSION.

Afternoon, February 11th—2:30 to 5:30 P. M.

“Maintenance of Earth Roads”—Mr. B. W. Hubbard, Farmer and Fruit Grower of Bedford County.

“Sand-Clay and Soil Roads”—Mr. F. D. Henley, Assistant Engineer, Virginia State Highway Commission.

In addition to these addresses the main feature of the closing session will be the reports of the officers for



MR. W. I. LEE.

County Highway Engineer, Tazewell county, Virginia, Treasurer Virginia Road Builders' Association.

1913 and short discussions of the reports, followed by the election of officers for 1914.

* * *

Capt. P. St. J. Wilson Becomes Assistant Director U. S. Office of Public Roads.

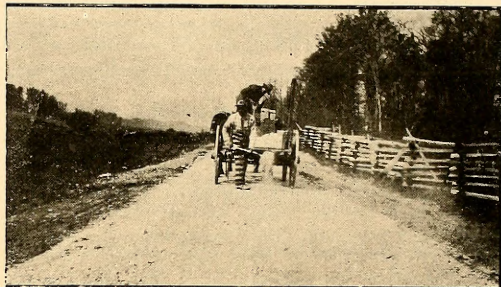
Captain P. St. J. Wilson, State Highway Commissioner of the state of Virginia since the creation of the office in 1906, tendered his resignation of this office to accept a position as first assistant to Hon. Logan Waller Page, Director U. S. Office of Public Roads. Virginia loses a most capable Highway Commissioner in Capt. Wilson and it is with much regret among the good road enthusiasts that he is given up.

Captain Wilson has accomplished a great deal during his term of office and more than two thousand miles

of permanent roads has been constructed under the supervision of his department. The two thousand miles of road constructed during Capt. Wilson's term of office are distributed over the state so as to give to almost all sections an object lesson of good roads.

Gov. Mann appointed Mr. G. P. Coleman, assistant highway commissioner of Virginia during Capt. Wilson's term, to succeed Capt. Wilson in the office of Highway Commissioner. There is no one in the state of Virginia more familiar with the good roads situation or more capable of filling Capt. Wilson's office than Mr. Coleman and Gov. Mann's appointment of Mr. Coleman meets with satisfaction over the entire state.

Mr. Coleman, since his appointment, has appointed Mr. C. B. Scott, President of the Virginia Road Build-



Spreading top-layer of stone on the Glade Springs-Damascus macadam road in Washington county, Virginia.

ers Association, Assistant Highway Commissioner. Mr. Scott has been assistant engineer to the State Highway Commission since January 1st 1907, in charge of road construction in the central and southwestern part of the state.

* * *

Bristol-Bluefield Highway.

The Bristol Herald is authority for the statement that Engineer D. Tucker Brown, who has been engaged in surveying the proposed new roads out of Bristol, is now preparing estimates as to cost, etc., to be forwarded to the State Highway Commissioner at Richmond and later transmitted by him to the board of supervisors of Washington county.

Engineer Brown and his assistants are still at work on the survey of the Bristol-to-Wise county highway. They recently finished the survey of the Bristol-to-Lexington highway. The survey of the Lexington highway will be made through Washington county to the Russell county line and several miles into Russell county.

The engineer and his assistants will start work on the survey of the Washington county section of the Bristol-to-Bluefield highway. This is regarded as one of the most important of the several proposed new highways and one of the most feasible. Those acquainted with the situation are confident that this road will be built and that Bristol will before a great while be connected with Bluefield, West Virginia, by a splendid new macadamized pike.

Clarksburg, West Virginia, has voted bonds for \$110,000 for building a bridge to connect Glenelk with Clarksburg. The bridge will be 628 feet long and will have a 26-foot driveway.

Sumter county, Georgia, is asking for bids on two bridges whose estimated cost is \$8,000.

North Carolina Good Roads Association

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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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THE American Highway Association, in co-operation with the U. S. Office of Public Roads, have devised a plan for the maintenance of the Washington-Atlanta Highway. The office of public roads proposes to put three of its engineers continuously on this stretch of road, and for the county authorities to place the section of road lying within their respective counties under the direction of these government engineers, who will direct the expenditure of such funds as are raised locally. The American Highway Association has undertaken to co-operate with local bodies in supplying each engineer with an automobile and in looking after the preliminary and incidental expenses.

The first step will be to make a tour over the road from Richmond to Atlanta and hold conferences at various points in each county with the county supervisors and a few of the leading citizens, so as to arrange the necessary plans for putting the maintenance scheme into effect. The State Geologist of North Carolina has been asked to join the party in connection with the tour through North Carolina. Entrance will be made into North Carolina in Granville county and a meeting held at Oxford, N. C.; then through Durham, Wake, Johnston, Harnett, Cumberland, Hoke, Moore and Richmond counties.

It is hoped that this scheme will result in fixing more firmly in the minds of the road officials of the counties in North Carolina through which this highway will pass the necessity for a rigid system of maintenance of not only this interstate highway way but of all of the roads of each county—the surfaced roads and the dirt roads.

It is expected this tour will take place sometime during the first two weeks of February.

In connection with its extension work, the University is getting out a bulletin containing subjects with data for debates in the high schools. The North Carolina Geological and Economic Survey has been asked to prepare certain data relating to good roads for this bulletin.

In connection with these debates, there is no better source of good literature which the young student can seek than "Southern Good Roads," and we would advise each school to have, if possible, a file of this magazine on hand. It is pretty well distributed over North Carolina, and it may be that private citizens will give their copies to the schools for filing, in case the school is not justified in subscribing.

References are given to numbers of "Southern Good Roads" in connection with the proposed debates.

ITEMS OF INTEREST REGARDING NORTH CAROLINA ROAD WORK.

The chairman of the Board of County Commissioners of Wilson county reports that that county built 30 miles of sand-clay road during 1913; and, in addition, has built 8 miles of entirely new road, county convicts being used in this work.

Mr. J. N. Ambler of Winston-Salem has been employed by the road officials of Meadows township in Stokes county to do the engineering work in their road and bridge construction. It will be remembered this township voted \$40,000 for building good roads.

It is reported that Lincoln county is going along rapidly with her road work, engineer in charge being Mr. R. M. Powers. There is a large grading force at work tearing up the road out on what is known as the "Morganton Road." 100 workmen and 200 mules are now employed in this work. It will not be very long before this county will have a good mileage of first-class topsoil roads.

On December 2nd., Lovelady township of Caldwell county voted \$25,000 in bonds for road improvement.

Dobson township in Surry county will soon have an election to vote on special tax for road improvement.

Orange county is progressing rapidly with her road work, having a force of hands at work grading the new highway from the east limits of the town of Mebane and working toward Hillsboro. Another force is working on the road between Chapel Hill and Durham, and Chapel Hill and Saxapahaw; another force on the road between the Durham county line and Hillsboro; and another in Cedar Grove township.

Five contracts for bridges have been let in Stokes county and county convicts are being used to build the road between Danbury and Meadows postoffice.

Warren county tried during the past fall to vote a bond issue, which failed to carry. Warrenton township then took up the matter and succeeded in voting a \$50,000 bond issue. There is now a move to enlarge this township so as to extend the mileage of good roads

to neighborhoods in Shocco township, so as to give the people of these sections the benefit of first-class roads. If the people of the entire county could be imbued with the spirit that is shown by Warrenton township, it would not be long before the country would have a splendid system of good roads.

* * *

On January 24th a movement was launched in Alexander county for a bond issue of \$100,000 for building good roads. The meeting was held in Taylorsville and was very largely attended.

* * *

The Durham Sun of January 7th states that:

"Over sixty farmers, all wanting their way accepted, came before the commissioner this afternoon at two o'clock, and the fight over the Guess road was then on."

It seems a bit humorous, if there were not an element of tragedy in it, that a county so progressive as Durham should allow its country roads to be located in such a manner instead of by an engineer, who is equipped for this kind of work. A board of commissioners, none of whom are road builders, surrounded by a throng of men, each seeking to further his own personal interest, deciding upon the location of a road far from the place of conference, regardless of the topography of the country and the grades involved. This is the picture. How long will North Carolina continue in this out-of-date method!

* * *

It is stated in the Charlotte Evening Chronicle that out of her bond issue, Iredell county has secured 217 miles of sand-clay road. This paper states that:

The four essentials for building roads that will stand the test are, location, minimum grade, proper drainage arrangements, and freedom from shade, declared Mr. Ozment. A great fault with road building is the effort to locate them in accordance with the wishes of the people and not where best suited. When a new road is to be built, Smith, Jones, Brown and all the others want it to pass their homes, and usually the man with the pull lands. This often results in locating the road at places least suited. Of course, it is always necessary to have as low a grade as possible, and there should be all arrangements for drainage. In building a road, it should be so located that it will receive the benefit of the sun's rays, and no road, whether sand-clay or macadam, will last long when it is shaded.

This is in marked contrast to the idea conveyed in connection with the location of the Durham county road; and road building will not be done satisfactorily in North Carolina until we adopt the business-like method, which necessitates the employment of a skilled engineer to give the proper location and grades to a road before any money is spent in surfacing it.

* * *

No. 7 township of Cleveland county has built about 7½ miles of road and crowned 7 miles during the past year. Twenty-five additional miles have been located. A letter from one of the road commission states that less than one-half mile in twenty-five is over 4% grade, and none over 4½%.

This township during the early portion of 1913 voted \$50,000 bond issue, and such a report shows the splendid progress that can be made by a highway commission bent upon giving the township full value of its road fund.

Lawrence county, Kentucky, will build four expensive steel bridges.

GOOD ROADS NOTES IN BRIEF

Hunt county, Texas, has voted \$400,000 of bonds to build 80 miles of roads.

Henderson county, North Carolina, will issue road-improvement bonds to the amount of \$95,000.

Franklin county, North Carolina, has voted \$40,000 of bonds for road work.

Sumter county, South Carolina, has issued bonds for \$10,000 for road work.

On March 28 Morgan county, Tennessee, will vote on a bond issue of \$300,000 for road construction.

Pasco county, Florida, has awarded paving contracts amounting to \$118,355.

Caddo parish, Louisiana, has contracted for two miles of heavy grading at a cost of \$15,000.

Pinellas county, Florida, has contracted for the construction of roads to the amount of \$13,196.

Rutherford county, North Carolina, will build 50 miles of sand-clay and top soil road.

Kentwood, Louisiana, is asking for bids on 7 miles of sidewalks.

Bell county, Texas, after a spirited campaign lasting two months, voted a bond issue of \$600,000 for building roads.

Sulphur Springs, Texas, has voted \$50,000 of bonds for street improvement.

On February 3rd, Louisa county, Virginia, votes on a bond issue of \$50,000 for road building.

On the 21st of this month there will be an election in the first special road district of Denton county, Texas, to decide on a bond issue of \$300,000 for roads.

Elgin, Texas, votes this month on a bond issue of \$30,000 to repair streets and bridges.

Brooks county, Texas, votes on February 14 on a bond issue for roads of \$34,000.

Celina Good Roads District No. 1, Collin county, Texas, votes February 21 on a bond issue of \$125,000 for roads.

St. John's county, Florida, is planning the construction of 65 miles of roads.

Tulsa, Oklahoma, will pave 12 blocks.

Houston, Texas, will spend \$20,000 on bitulithic paving.

Marion county, South Carolina, has voted a bond issue of \$100,000 for good roads.

Mercer county, West Virginia, voted last month a bond issue of \$500,000 for road-building.

Pleasants county, West Virginia, will spend \$60,000 in road building.

Manatee county, Florida, will vote March 26 on a bond issue of \$322,590 for road construction.

Independence, Missouri, has contracted for street improvement amounting to \$81,180.

Galveston county, Texas, is asking for bids on the construction of 50 miles of roads. It is estimated that this will entail an outlay of \$200,000. The surfacing of these roads will be with mud shell, 8 inches deep and 12 feet wide.

Galveston county, Texas, has a large sum available for building bridges and culverts.

Franklin county, Tennessee, will vote on the 12th of this month on a bond issue of \$250,000 for piking 125 miles of roads.

South Carolina Good Roads Association

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Edited by PROF. F. HORTON COLCOCK
University of South Carolina, Columbia, S. C.

SOUTHERN GOOD ROADS will devote this page exclusively to the interests of the South Carolina Good Roads Association. It will be open at all times to contributions from members of the Association in regard to Association affairs and road problems in the State. Send all contributions for this page to F. HORTON COLCOCK, University of South Carolina, Columbia, S. C.

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IN MY last article I spoke of three schools advocating earnestly the congress of the United States appropriating annually money for the building of public roads, these may be in general said to be, First, those who advocate the parallels and meridians across the United States for locations; Second, those who advocate the radiation from prominent points in the respective states towards other prominent points so that the line could be from cross state roads, and Third, those who think the roads should radiate from smaller points, or points of less importance in the states outward towards the farms.

Let us take up the first, of whom there are a goodly number, and in this class may be included the old trails people, for after all the old trails were mostly roads reaching out to open up and connect the widely separated sections of the country.

The advocates of this school put forward some very strong and convincing arguments. Just suppose the government were to make a checker board of the country, with the squares fifty, a hundred, or even two hundred miles across, how soon the problem would be solved, for then all points within these squares would soon be stimulated to open up equally good roads reaching out to these roads so as to be able to utilize them. Even if the checker squares were much larger the stimulating effect would be great. Besides how many hundreds of thousands of people would benefit directly therefrom! How instantly the property would double and triple and quadruple in value!

The folks on these highways would have the transportation facilities so increased that ten dollars would do what had formerly required fifty. They would all buy auto trucks and do their hauling in a very short time. The mules and horses would never leave the farm and thus the producing power of the country would be vastly increased. The merchants instead of delivering goods only in town would radiate out to twenty or thirty miles, the farmers could have truck trains and sell their milk and vegetables by having such trains take the produce up at their gates every morning; the house wife could have her order for dinner sent to the butcher and grocer at the same time and have the supplies back to cook for that day. And so on, and so on. But Where? Only along these roads, remember that.

What a great advantage to the government in times of war! These great roads would then become military roads and there would be little difficulty in mov-

ing armies and supplies. No cannon stalled in boggy bottoms and thus reaching the scene of battle too late. And so on, and so on.

How many thousands and hundreds of thousands of men out of employment could find work who are now idle. Good wholesome work in God's open air. Even the soldiers in times of peace might be allowed to work so many hours a day and thus increase the small stipend that the government allows them, and better and more men be induced on this account to enlist, and thus the size and efficiency of the army be increased. Wherever the Romans went their first task was to build roads and thus they became a powerful people which ruled a large part of the known world.

Many sections of the country now inaccessible would be reached and thus new territory opened up for occupation and development. People realizing that the great bug-bear of the farm, isolation and deprivation of all community benefits no longer existed, would no longer rush to swell the already over congested population of our urban communities. The towns instead of draining people to themselves from the country would have to disgorge themselves, and only those who were pursuing a legitimate and profitable business would remain. As a full appreciation of the glory of being independent and working only for himself, no man his master, beat down into the brain of a man, he would rush out to the country with the feeling that a boy has who rushes out from his school after long confinement, into the open air and unrestraint. The masses of the people would become more independent and thus be able to consider all questions of governmental importance from an unbiased and unafraid standpoint, and thus the citizenship of the country would be vastly elevated, the questions of importance of the day decided from this independent electorate would more truly approach the correct solutions and give us a real democracy.

* * *

Aiken to Get Federal Aid.

Aiken county took a long step forward with the beginning of the new year in arranging for the federal appropriation of \$10,000 for road-building in the county. At their first meeting in January the commissioners of Aiken county voted an appropriation of \$20,000 for the work. The new road will begin at the Edgefield county line and run to Aiken and on from Aiken to the Barnwell county line, a distance of 28 miles. This will give Aiken one of the best stretches of road

in the state and will serve a large number of people.

A big delegation of progressive citizens was present to give encouragement to the board, including merchants, bankers, lawyers and farmers. Among those who made speeches are noted the following:

Mayor Giles, of Aiken, Dr. Hammond, Messrs. H. M. Dibble, J. T. Shuler, P. E. Henderson, C. B. Woosley, G. O. Murray and R. B. Carter.

* * *

Calling For Information.

A call was issued last month from the South Carolina Department of Agriculture to county road supervisors all over the state, for data on the highways of South Carolina. In co-operation with the United States Office of Public Roads, the department is gathering this information for the use of congress in formulating a national good roads bill and will also be used for the South Carolina legislature.

Information is asked as to public road and bridge expenditures, property road and bridge taxes, bond issue expenditures, statute labor or poll road taxes, assessed valuation, tax rate for roads and bridges and the number of miles, improved and not improved, and the kind of material used in the construction.

Following letter has been sent out to county supervisors:

"In accordance with the terms of the law relating to the furnishing of information to this department when called for by the commissioner, I am sending you blank forms requesting certain information.

"Independent of the terms of the act, however, I wish to make a most earnest request that you send this report to me by the first possible mail after you have received the blanks. I am exceedingly anxious to collate this information and incorporate it in my annual report to the general assembly, and if this is accomplished it is absolutely necessary to get reports quickly.

"A franked envelope is inclosed for your use.

"Your prompt attention will be greatly appreciated."

Warren county, Kentucky, votes next month on a bond issue of \$300,000 for roads. This county already has 250 miles of macadam roads and the proposed issue, if voted, will be sufficient to give the county a complete system of good roads.

A big project is under way in Texas. A private company has been organized to construct a motor highway from Dallas, via Fort Worth to the mouth of Devil's River on the border of Mexico. The cost will be about \$8,000 per mile. About 40 miles of the road have been built and the road has been surveyed from Dallas to Clairette in Erath county, a distance of 106 miles. The managers will complete the first 100 miles of the road by June 1.

Houston, Texas, is planning to do great things in the way of street improvement. The city appropriated between March 1, 1913 and January 1, 1914, \$310,000 for street work and now has available for appropriation for streets, 757,000.

Louisville, Kentucky, is preparing to undertake the re-construction of its system of streets at a cost of \$540,000.

Hays county, Texas, votes on February 14 on a bond issue of \$50,000 for road improvement.



BRIDGES & CULVERTS

Jackson county, Arkansas, will bridge Village creek with a 250-foot structure at a cost of \$5,000.

A bridge is to be built across the Dan river in Rockingham county, North Carolina.

The Jefferson County Bridge District, of Jefferson county, Arkansas, has begun construction of the bridge across the Arkansas river. The bridge, complete, will cost \$700,000. The bridge will have 7 steel spans, 6 of them 240 feet long and one 150 feet long. The total length, including approaches of 1400 feet, will be 3007 feet. The work is to be finished this year.

Manatee county, Florida, votes next month on a bond issue of \$180,000 for bridges and culverts, this to include a bridge over Manatee river, one mile in length, whose estimated cost is \$110,000. The bridge is to be of re-inforced concrete.

Giles county, Tenn., is considering a bond issue of \$100,000 for bridges culverts and roads.

The commissioners of Johnson county, Missouri, have contracted for the construction of 26 steel and concrete bridges.

Bastrop county, Texas, votes this month on a bond issue of \$50,000 to re-build bridge across the Colorado river and a few other bridges destroyed by recent floods.

The commissioners of Bexar county, Texas, will spend \$200,000 in the construction of 8 or 10 medium length bridges and several smaller bridges and culverts.

The commissioners of St. John's county, Florida, will bridge the San Sebastian river at the foot of King street in St. Augustine at a cost of \$18,500.

Richmond county, Georgia, is preparing to build six or seven re-inforced concrete bridges with convict labor.

Hamilton county, Tennessee, has voted bonds for \$500,000 to build a bridge across the Tennessee river at Chattanooga.

The city of Fort Worth, Texas, has contracted for the construction of the Nine-Mile bridge, at a cost of \$15,945. It is to be 1,305 feet long.

It is announced that the commissioners of Brazoria county, Texas, will join with the Houston & Brazos Railway Company in the erection of a bridge over the Brazos river to connect Freeport and Velasco. It will cost \$120,000.

Robertson and Milam counties, Texas, have employed engineers to design and superintend construction of a 550-foot bridge across the Brazos river.

Bexar county, Texas, will spend \$15,000 on a bridge 12 miles east of San Antonio.

Waco, Texas, will vote on the 16th of this month on a bond issue of \$50,000 for bridges and culverts.

The commissioners of Lee county, Florida, have been petitioned to construct a bridge across Caloosahatchie river at Olga. Citizens of Olga have raised \$1500 to help build the bridge.

The commissioners of Bexar county, Texas, have contracted for the construction of a bridge across Leon river, on the Palo Alto road, at a cost of \$12,747. The cost will be provided out of the recent bond issue of \$200,000 for bridges and culverts.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

There have been many complaints from different parts of the state in regard to the up-keep of the highways built by state aid, according to reports in the Montgomery Advertiser. When the Alabama State Highway Commission held its quarterly meeting at Montgomery last month these complaints were taken up and State Highway Engineer, W. S. Keller, was instructed to ascertain the number of state-aid roads that have not been maintained properly and to report on these at the next meeting of the commission.

Those counties in which the roads have not been maintained may be visited by the State Highway Engineer, who will make personal inspections. Mr. Keller stated at the meeting that he will at once write all Probate Judges in the counties in question and will ask for reports on the condition of the state-aid roads. The commission has authority to pay for the proper maintenance of state highways out of the unused funds that accrue.

In a statement of the overlapped appropriations for the years 1911 and 1912, it was shown that a total of \$92,471 is available for re-distribution among those counties taking advantage of the state-aid funds. This will make \$1,380 available for each county in addition to the annual appropriations of \$2,000.

Mr. Keller submitted his quarterly report to the commission. In this report he declared that state-aid work was begun in eight counties during the quarter ending December 31, 1913. State-aid work was completed during the quarter in seventeen counties. Those present at the meeting were Dr. Eugene A. Smith of Tuscaloosa, Captain John Craft of Mobile, Professor G. N. Miteham of Auburn, W. S. Keller, State Highway Engineer, and R. P. Boyd, Assistant Highway Engineer.

Mr. Keller's report follows:

"State Highway Commission of Alabama, Montgomery, Ala.

"I submit this, my report as State Highway Engineer for the quarter ending December 31, 1913:

"Complying with your instructions, I employed a draftsman to make a road map of the state. This map is almost completed and would long since have been finished if all counties had been prompt in sending us maps of their counties with main travelled roads shown on them. Twenty-three counties have so far failed to comply with our request. If these maps were in, the state map could be completed in three or four days.

"During this period work was begun in the following counties:

"Winston county by contract, Cleburne county by contract, DeKalb county by contract, Jackson county by contract, Etowah county by county forces, Fayette county by county forces, Autauga county by contract, Calhoun county by contract.

"Work was finished in the following counties:

"Barbour, bridges; Blount, Clay, Colbert, Coosa and Dale, road; Greene, bridges; Hale, Lowndes, Macon, Marengo and Morgan, road; Montgomery, bridges; Pickens, roads, Washington, bridges, Perry and Shelby, roads."

Arkansas.

What is heralded as a forerunner of a new era in road-building in the South, a concrete road, with a top coating of asphalt, is described by the Little Rock (Ark.) Democrat. The road is now in process of construction between Pine Bluff and Little Rock. The road authorities of several counties are watching the work and if the road comes up to their expectations, a revolution in road-building methods in Arkansas may result.

The construction work on the road is being pushed and by early summer will be near completion. The contract for twenty-two and one-half miles of the road lying in Jefferson County has been let, and three miles of this is well under way. The concrete work on this three-mile stretch has been completed.

The contract calls for a nine-foot concrete base with a top dressing of asphalt. The concrete base will be five inches thick, giving it ample strength to withstand the strain of heavily loaded wagons. On each side of the concrete and asphalt will be three feet of gravel, making adequate room for passing vehicles. The gravel will be graded and rolled to make it of uniform levelness with the roadbed proper.

This road, it is believed, will be durable beyond any grade of road ever constructed in Arkansas. The three miles of road out of Pine Bluff on which the concrete work has been finished are being used by Pine Bluff and Jefferson county residents. The concrete is so hard that loose gravel lying on its surface is pulverized by heavy traffic, yet no trace of the traffic can be found on the concrete surface itself.

Eagle Portland cement and river washed gravel are being used.

The contractors throw the road open for traffic as soon as the concrete "sets." In the spring when the asphalt laying commences the surface of the concrete will be cleaned and traffic kept off until the asphalt has hardened.

The road does not follow the course of the old road, but cuts directly through vast stretches of timber, making a picturesque and a beautiful drive. The road is practically level, numerous fills and cuts being made to eliminate hills. For some distance the road parallels the Iron Mountain road.

All creeks will be bridged, and permanent reinforced concrete structures will be erected.

Pulaski county's share of the road will consist of 13 1-2 miles, while six miles of the highway will lie in Saline county. The Saline county officials have taken no definite action on the road, but it is believed they will have let the contract by early spring. It is possible that Saline's share will be of concrete construction, but more likely it will be macadam, as is Pulaski's.

The 13 1-2 miles in Pulaski county will be of macadam, with a width of 22 feet from ditch to ditch and a 14-foot roadbed proper. Twelve miles of this road are now finished, and the remaining mile and a half will be finished by spring.

County Judge Joe Asher, of Pulaski, said that while the concrete road would make an excellent highway, he believed the cost too great in proportion. The high-

way in Jefferson county, according to contract price, is \$7,500 a mile, or about \$158,000 in all. The macadam road in Pulaski county costs approximately \$4,000 a mile.

When the entire road is finished and thrown open to traffic, it will be an excellent highway, and will be an ideal route for motorists from Little Rock to Pine Bluff. Its total length will be 42 miles.

* * *

Georgia.

Hon. Gordon Lee, representative in congress from the Seventh congressional district of Georgia, is of the opinion that congress, at the present session, will appropriate \$20,000,000, or more, for federal aid in road-building.

"It is very important that the state of Georgia should get ready to accept the money that will be offered it by the United States government," declared Mr. Lee. "The legislature should pass a bill at the next session providing for a state highway commission or some state department that would be in a position to receive the federal funds and would be responsible for their expenditure.

"The growth of good roads sentiment in congress has been nothing less than amazing. I can remember only a few years ago when not more than ten or twelve congressmen looked with approbation on the movement and the suggestion that government funds should be appropriated to the construction of public highways in the states was productive of nothing more than a smile.

"It is all changed now, however, and, so strong is the sentiment for federal aid that members have been almost falling over each other in introducing bills on the subject. There will be twenty or thirty bills introduced at this session of congress. Of course, no one of these measures will pass, just as it is drawn, but there will be a composite bill worked out of the committee which will give the results desired. That this bill will pass and become a law, I have hardly a doubt."

The bill that finally passes, in the opinion of men who know, will give government aid to those states that have well-organized highway departments to direct the expenditure of the money, and which have made provision for state roadbuilding funds. It has been suggested that Georgia use the automobile fund amounting to about \$100,000 a year, for the establishment and support of a state highway commission and this plan has the approval of Representative Lee.

* * *

Maryland.

The legislature of Maryland is making a careful investigation of the further needs of the state in the way of state roads. The committee in charge of the investigation is known as the Gorman legislative committee and it recently had before it Mr. O. E. Weller, chairman of the State Roads Commission for the purpose of getting his views on the continuance of state road construction.

The Gorman committee, according to those who are in close touch with its workings, is expected to draft a bill providing for a big loan, \$5,000,000 or more, for the completion of the state highway system. It is understood that Mr. Weller took the position before the committee that the most important step would be to provide for building the links that will make of the roads already finished main trunk lines. The work has now advanced to such a stage that the importance of further appropriations is manifest to every one who has made the most cursory study of the question. The

energies of the commission have for the last year been devoted to rushing work on these links and the results have been notable.

While the legislative session of two years ago showed some hostility to the road-building program it is evident that much of this has been removed through the business-like way in which the road commission handled its task.

With a sufficient appropriation by the incoming legislature the next 2 years will place Maryland among the foremost of all the states of the union in the matter of road building and will leave little to be done thereafter by the state except the maintenance of the roads already built.

* * *

Mississippi.

The Meridian Dispatch, of Meridian, Mississippi, carries the news that the paving contract let by Lauderdale county to J. O. Kittrell, trading as the Tennessee Stable and Transportation company, of Nashville, on June 4, 1913, has been rescinded and the surety on the bond has been ordered to take up the work and carry it to completion or the contract would be let to some one else. The effect of this would be to force the county to seek recovery for any damages sustained under the bond of the original contractor, the same being for \$105,000, made by the United States Fidelity and Guarantee company.

It was learned that it was the purpose of the guarantee company to take up the work and complete it.

The county good roads commission, composed of T. C. Kinard, G. T. Lockard and H. F. Broach, spread an order on their minutes, the effect of which was to eliminate Kittrell and his company from the contract.

For some time there has been a great deal of complaint that the road contractor was slow in getting the work done; that very little progress had been or was being made. These complaints reached the board of supervisors and the members urged the contractor to proceed with the work, but it is still claimed that very little work has been done, although more than half a year has passed since the contract was awarded to the Nashville concern.

Under the terms of the contract made with the good roads commission and ratified by the county board of supervisors, the contractors were to do the following work, which amounted to the construction of about 35 miles of good roads:

- Extend Poplar Springs road to the district line.
- Extend the Daleville road to the district line.
- Extend both prongs of the Marion road to the district line.
- Build the Russell road.
- Extend Bonita road to the district line toward Why Not.
- Extend Zero road to the district line.
- Build the Enterprise road to the district line.
- Build Eighth street road to the district line.
- Build College road.

All of this was embraced in the contract, and on this it is claimed that the progress has been so slow as to warrant the notice to the bonding company that it must take up at once and complete the work, as the county was now looking to the bond company to have the work done.

* * *

Missouri.

Building of from 400 to 600 miles of improved highways in all directions from Springfield, making Springfield the hub of more new improved roads than any other one city in the state, is proposed for 1914. Chief

of the big undertakings is the Joplin-Springfield road, a part of which has been completed. If as much success is met with this year as in 1913 on this particular highway, it will be well near completed by next year.

Others of great mileage will be the Springfield-Sedalia highway, the Springfield-Jefferson City road, a road from Springfield to the east and south, probably to West Plains or even to Thayer, a Springfield-Branson road, and numerous smaller stretches of roads in Greene county. Included in the last named will be work on inter-county seat highways connecting Springfield with the capitals of adjoining counties.

State Highway Commissioner Buffum is working on a project for connecting Springfield and Jefferson City with a good road. By a good road is meant, as expressed by Mr. Buffum at a recent meeting of road enthusiasts in Springfield, a road that is rooked, of proper width and on which culverts and bridges are as numerous as demanded and substantially built.

The route for the Springfield and Jefferson City road has not been definitely determined upon. To go direct would lead through some very bad road-building country in Camden and Miller counties. However, a fairly good road is now maintained between Springfield and Buffalo, Dallas county, which would be a good stretch on the direct route. The project is to be given a good deal of attention by Commissioner Buffum.

* * *

Indiana.

There are 26,690 miles of improved roads in Indiana, according to figures made public by L. G. Ellingham, secretary of state. Under the new automobile license law each county will receive a part of the tax for each mile of improved highway. This year the rate is \$1.49 per mile.

According to the figures, Clinton county, with 868 miles, leads the list, and is followed closely by Putnam, with 800 miles. Noble and LaGrange counties are without a single mile of improved highway, while Steuben has only one mile, DeKalb six, and St. Joseph and Perry, nine each.

Other counties and their mileage follow: Tippecanoe, 562 miles; Vanderburg, 181 miles, and Vigo 386 miles.

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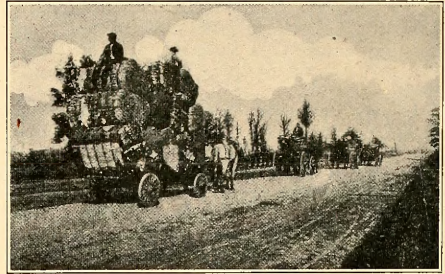
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Road Building Progress in Louisiana

By W. E. ATKINSON

State Highway Engineer of Louisiana

No authentic information can be obtained at this time of the extent of highway construction in this state undertaken or proposed by various authorities without the aid of this department, but figures compiled

convicts on the levees and the roads, but always under the care and supervision of the board of control, a state institution. While at work on the levees, they earn revenues for the board of control, as the work is done under contract at an agreed price per cubic yard. However, they earn absolutely nothing for the board of control when at work upon the roads.

The entire expense of their maintenance, while road building, is paid by the Parish employing them. With the gratis services of the engineering corps of the Highway Department, the Parishes have an excellent form of state aid in addition to that secured in a monetary way.

The floods of the last two years caused much damage to the 1,600 miles of levees in Louisiana and in consequence, the state found it necessary to withdraw all convicts employed on the highways, in order that the levees could be made safe as soon as possible. Now that this work is completed, I do not think it will be long before the State Highway Department will be permitted to use a large force of convicts for highway construction.

During the year 1913, contracts were entered into for the construction of ten State Aid Highways, aggregating 103.8 miles, to cost approximately \$339,924.62, of which 35.8 miles were gravel and 68 miles improved earth and sand-clay roads, most of which includes reinforced concrete bridges and culverts.

Applications from various parish police juries on file to date applies for state aid on the construction of approximately 250 miles, surveys of which are being made for the purpose of preparing estimates of cost, etc., etc. It is probable that construction of at least 200 miles will be undertaken during 1914.

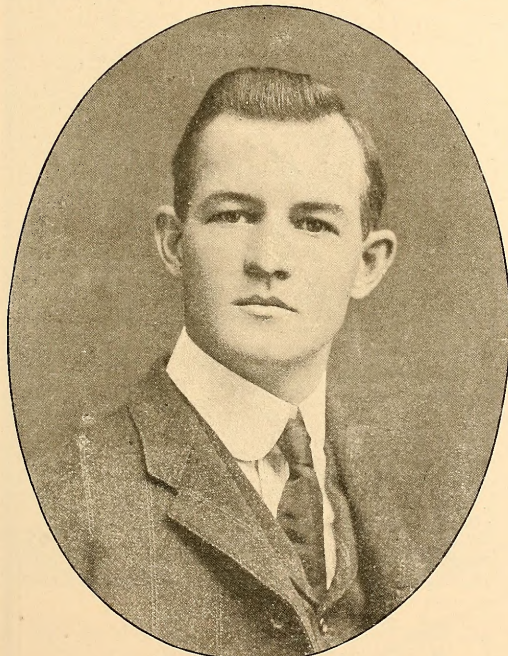
During the year 1913, approximately 180 miles of highways were completed, at a cost of about \$450,000. The total approximate mileage of highways constructed and under construction since the organization of the department on February 1st, 1911, is 301.5 miles, costing approximately \$794,376.72. Of this amount, approximately 219 miles were of improved earth and sand-clay, costing approximately \$418,000; 37 miles were shell, costing approximately \$122,500; 9.5 miles were petrolithic, costing \$53,876.72, and 36 miles were gravel, costing approximately \$200,000.

Forms of State Aid.

The Highway Department, Board of State Engineers, has four forms of State Aid which are available to Parishes in constructing State Aid Highways in Louisiana:

1st—Monetary State Aid:

This form provides for the construction of highway



MR. W. E. ATKINSON,
State Highway Engineer, of Louisiana.

some time ago would indicate that over a half million dollars is being expended annually for general highway improvement in this state, exclusive of those projects undertaken by the Highway Department.

The State Highway Department was formally organized February 1st, 1911, although state convicts were used in highway construction about two years previous to this date. The work accomplished with convict labor represents the construction of about 175 miles, in eight Parishes, of improved earth and sand-clay roads.

The penitentiary laws of this state permit the use of

projects by contracts and is paid for by the State and Parish on the proportions agreed upon.

2nd—Convict State Aid:

This form provides for the construction of highway projects with Convict Labor furnished by the state, the Parish paying for their upkeep and all other expenses in connection.

3rd—Road Outfit State Aid:

This form provides for the construction of highway projects with road equipment belonging to the state,

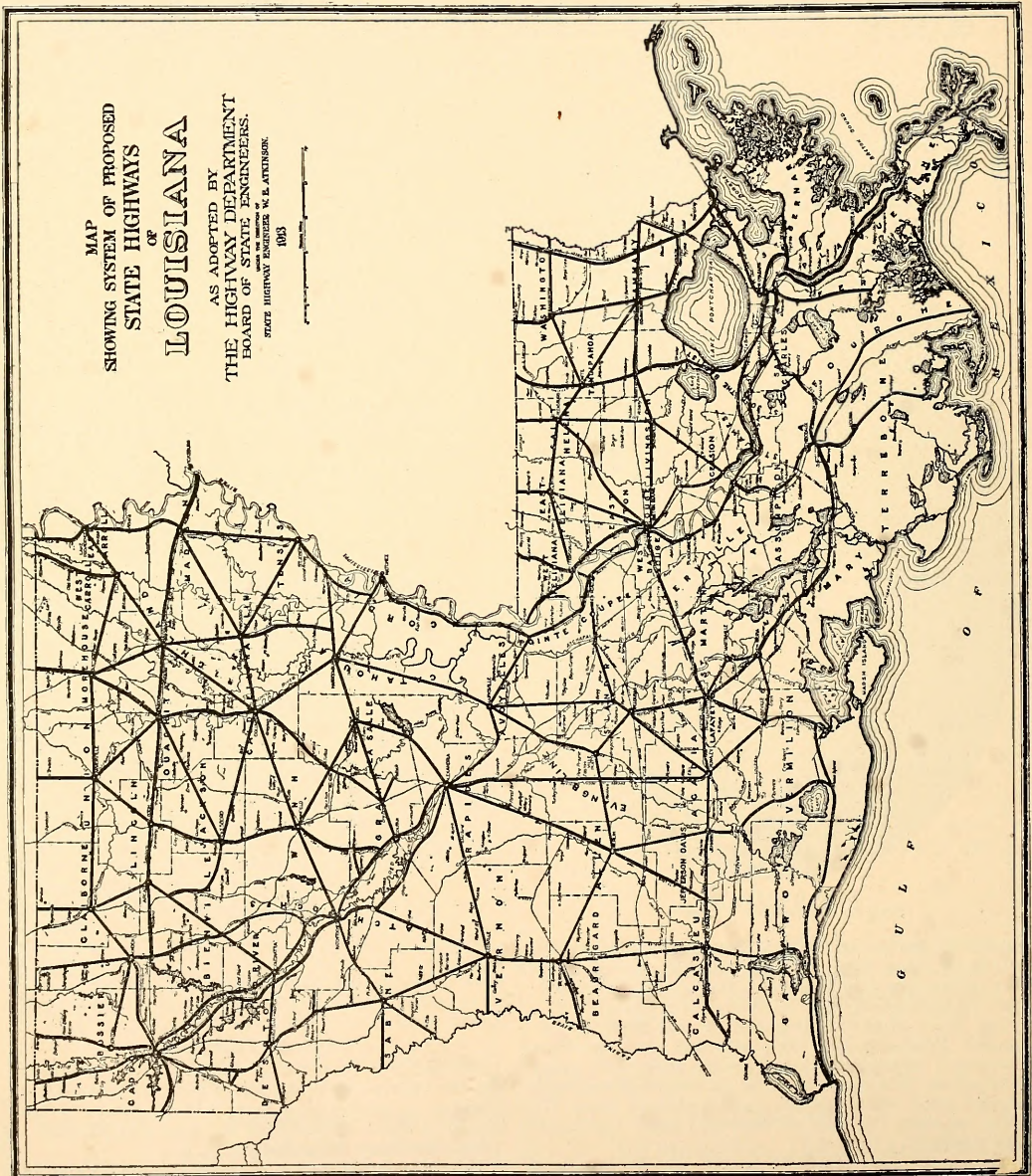
the Parish paying all other expenses in connection.

4th—Force Account State Aid:

This form provides for the construction of highway projects with free labor, after having been advertised and bids rejected. The cost to be paid by both state and parish on the proportions agreed upon.

All State Aid Highways, regardless of form, are constructed under the supervision of the State Highway Department, Board of State Engineers.

The interest in general highway improvement in this

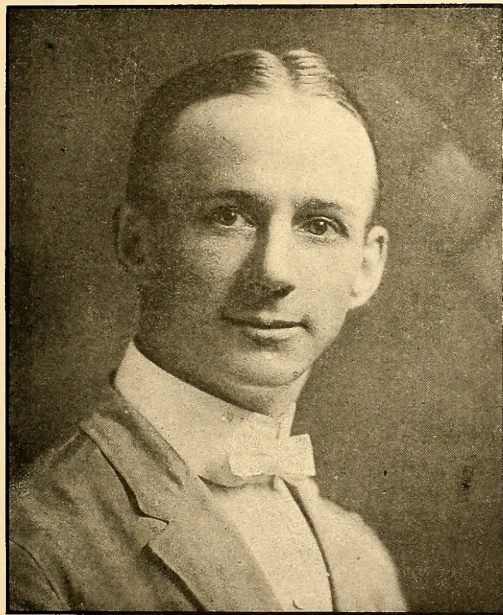


state is becoming a real live issue. Nearly every Parish in the state has voted a special tax for highway improvement, or is about to do so, and twenty-three parishes have applied to the state through this Department for State Aid out of the funds of the current year. Apportionments out of the highway fund have only recently been made to thirteen parishes and the department proposes to advertise for bids for the construction of these projects in the very near future. The department hopes to make apportionments to the others later on.

In compliance with a request made by the National Highways Association to designate the location of national highways in Louisiana, the highway department suggested the following:

No. 1—New Orleans-Shreveport Highway—400 Miles.

Enters the northern part of the state near Ida, on the west side of Red River, and following along same through Shreveport, Natchitoches, Alexandria, Marks-



MR. C. C. SANDOZ.

Secretary Highway Department Board of State Engineers of Louisiana.

ville, New Roads, to Port Allen, where it crosses the Mississippi River to Baton Rouge, following the east bank to New Orleans; thence easterly along the Louisville and Nashville railroad to the west boundary line of the state.

No. 2—New Orleans-Little Rock Highway—360 Miles.

Enters the state from the north near Truxno and goes through Farmersville, Ruston, Jonesboro, Winnfield, Dry Prong, Alexandria, Marksville, Washington, Opelousas, Lafayette, New Iberia, Franklin, and along the Southern Pacific railroad to New Orleans.

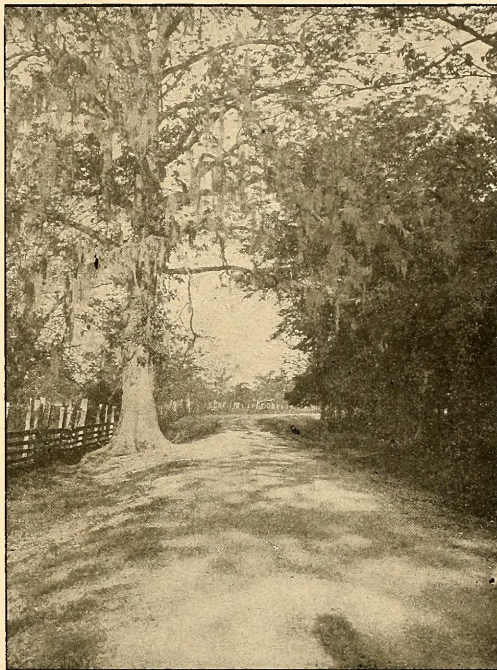
No. 3—Vicksburg-Shreveport Highway—200 Miles.

Starts on the west bank of the Mississippi river opposite Vicksburg, and passes through Tallulah, Ray-

ville, Monroe, Ruston, Arcadia, Shreveport, and westerly to the state line.

No. 4—Baton Rouge-Austin Highway—210 Miles.

From the west line of the state, near Jacksonville, through Lake Charles, Jennings, Crowley, Lafayette,



This is a section of gravel highway near Colfax, Louisiana. The gravel road properly constructed has few superiors.

Baton Rouge, Springville and to Hammond, where it connects with north and south highway No. 5.

No. 5—New Orleans-Jackson Highway—80 Miles.

From New Orleans easterly and northerly along and around Lake Ponchartrain, through Hammond, Amite, Kentwood and north to the state line.

No. 6—Shreveport-Gulf Highway—200 Miles.

Commencing at Shreveport and running southerly through Mansfield, Many, Leesville, DeRidder, Lake Charles and Cameron to the Gulf Coast.

The State Highway department is operating under Act 49 of 1910 creating the highway department of Louisiana, which is considered a model of its kind. The revenues are derived from a tax of one-quarter of one mill on the entire assessment of the state, and is protected by an amendment to the constitution of the state.

Wisconsin is enjoying marvelous activity in building gravel, macadam and paved roads from state aid offered to its counties in proportion of one of state money to two of county money. The first year Wisconsin appropriated \$350,000 and the counties asked for \$450,000. Then the legislature appropriated \$378,000, and the counties asked for \$830,000, and for this year the legislature has provided \$1,200,000 state aid.

Pulaski county, Kentucky, will vote April 17 on a bond issue of \$300,000 for road improvement.



GOVERNOR L. E. HALL, OF LOUISIANA.

The Merit System in Road Management

By **LOGAN WALLER PAGE**, Director U. S. Office of Public Roads

An Address Before the Civil Service Reform League, Boston, December 13, 1913

IN CONSIDERING the application of the merit system to the management of the public roads of this country, it may be well at the outset to present an inventory, so to speak, showing what is comprised in our public road system, and what is involved in the construction, maintenance, administration, and use of the public roads.

Broadly speaking, the public roads of the United States comprise a transportation system nearly ten times as great in mileage as all of the railroads of America combined, or approximately 2,300,000 miles. The annual expenditure on these roads is estimated at the present time to be approximately \$200,000,000. No census has been taken to show the number of officials having to deal with the management of the roads, but 100,000 would be a conservative estimate. It is thus evident that we are dealing with a public utility which is of sufficient magnitude to warrant the most serious and earnest consideration from thoughtful American citizens as well as from every unit of American government.

Aside from the question of magnitude, we must consider the public road system of the United States as the only one of the great systems of transportation which is owned and controlled by the public, and in which every tax payer, rich or poor, is a share holder. The wisdom of public ownership is a mooted point, but there can be no question that a great utility which is already owned by the public should be administered with an efficiency at least equal to the management of privately owned utilities. If this is impossible we should discover the intrinsic weakness in our system which renders such management impracticable.

As most of the original colonies were under English control and largely recruited from English people, it followed that the old common law and the various customs of England should find lodgment in the political institutions of the new country. The result of this was that the principle of local autonomy with corresponding local control and management of roads was firmly established at an early date. When the colonies became states these laws and customs were but little changed and in many cases they have come down to the present day perpetuating a system which now has no justification from the standpoint of either utility or sentiment. Briefly explained, this system is one of extreme localization whereby in most of the states each precinct is in charge of a road overseer who reports to a county board of commissioners with many and bewildering interlockings of other officialdom such as supervisors, trustees, and superintendents. As a natural consequence the road system of each state is divided into an amazingly large number of miniature systems each independent of the other. The revenues for road purposes are largely expended in the payment of salaries and expenses of an unnecessarily large number of road officials whose duties and responsibilities are at best vague.

It seems never to have occurred to our early law makers that any particular skill or knowledge was required in the building or maintenance of roads, consequently, with but few exceptions, legislation in the various states makes no requirement that those officials who are charged with the improvement and care of the

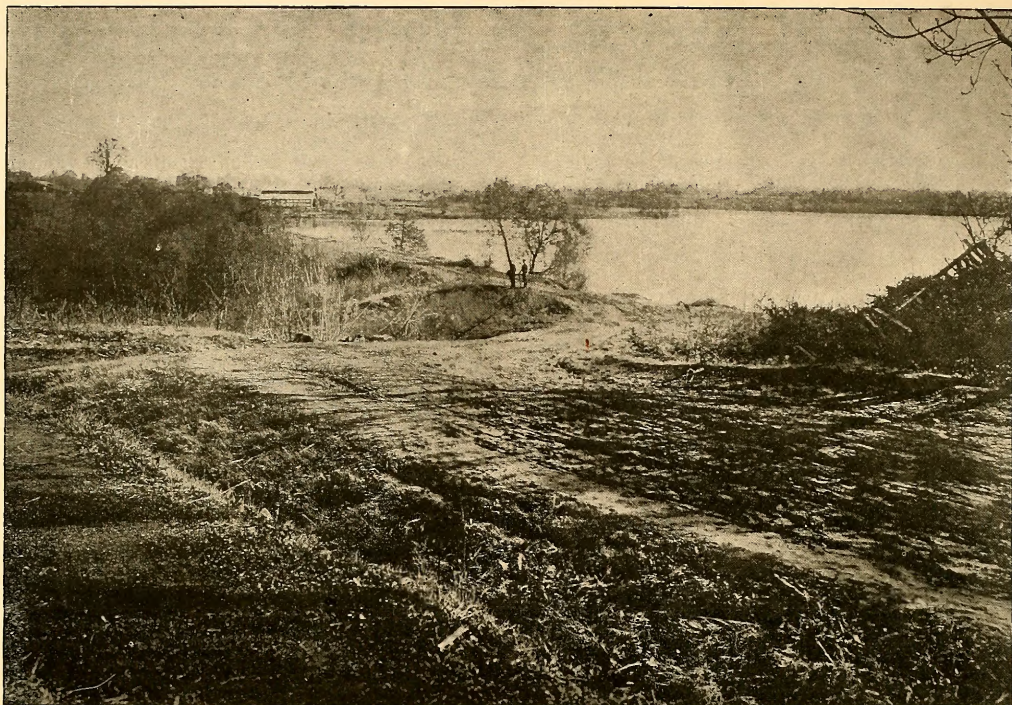
roads shall possess any distinct qualifications. In logical sequence the men who are selected for this work are for the most part men whose popularity or influence in the community is such as to enable them to obtain the office for themselves or their friends, without regard to their special fitness for the position. The roads are as a rule cared for by well intentioned and intelligent farmers who know little or nothing about road work, and who give to this public duty only such time as they can spare from their private interests.

These road officials are not required by law or regulation to give all of their time or even a considerable portion of it to road work. Nor do the laws or regulations provide for any reasonably thorough inspection or maintenance. The compensation which is paid to local officials is usually very small, so far as the individual is concerned but very large in a collective sense. As a consequence a further tendency is shown to consider the road as a mere side issue and to discourage the skilled and competent road builder from undertaking a work on which he could not make living compensation, and under a system in which he would have to operate with almost a certainty of failure.

Still another characteristic of our public road system is the election of road officials for definite terms of office rather than the appointment of such officials for an indefinite term. I need scarcely call your attention to the fact that very few engineers combine the qualities of a good engineer and a good politician, and it is very likely to happen that if a good engineer should seek election to office his opponent, if he is a good politician and a poor engineer, would defeat him, much to the detriment of the public.

Finally, I would call attention to the baneful influence of partisan politics and in a measure the influence of local community politics. A public road is public utility which is a necessity to all of the people who have occasion to use it. It is a liability upon all the people who have to pay taxes for it. It is a constructive work which requires skill and knowledge and constant attention, and wherever, for political considerations, any of these essential features are ignored or modified the public must suffer. We must get to a condition of affairs where the practice of putting petty politicians in control of a vital public utility for the purpose of paying a political debt must be stopped; where the expenditure of the public money in constructing a public enterprise which is of benefit only to the politician or his immediate henchman, must be discontinued. The road system of the country must be treated as a great business enterprise and conducted honestly, wisely, and with a reasonable balance between benefits and burdens.

There are a great many people who favor improved roads, but I doubt if very many of them realize the vital significance of the good roads movement in America today. Over half of our people is now concentrated in cities and towns and the city population is increasing far more rapidly than the country population. Our exports of food products have been falling off steadily until we are almost at the point where we shall have to go outside for food unless we increase production on the farm areas which are easily accessible. Isolated country churches are struggling along hopelessly in



Scene near Baton Rouge, Louisiana. It was a perfect "Slough of Despond" before improvement and a source of much discomfort.

many cases because of their inaccessibility; country schools in States afflicted with bad roads show an alarmingly low ratio of attendance to enrollment as compared with the States which have reasonably good public road systems. For example, we found some years ago in five States which had an average of 1.5 per cent of road improvement, the school attendance was 59 out of each 100 pupils enrolled, while in five other States having an average of 40 per cent of improved roads the school attendance was 78 out of each 100 pupils enrolled. Something must be done to improve the conditions of rural life, and I confidently assert that the improvement of public roads is one of the most effective of the remedies which can be proposed to better these conditions.

National aid to road improvement is one of the plans proposed and I have no doubt this policy will be inaugurated in the near future. State aid is already well under way and has been constantly growing since 1891, when New Jersey first embarked upon the plan of having aid granted directly by the State, and a measure of State supervision provided. Counties and States are bonding themselves to build hard-surfaced roads, and this is helping to some extent but to my mind the primary necessity is to reform and revise our existing road systems as to insure the effective construction of the roads, continuous and adequate maintenance, and honest and capable handling of our road revenues.

I had hoped that when the States as units took hold of the road problem they at least would eliminate to a very great degree the baneful influence of politics, but the history of the changes in state highway departments during the past ten years would indicate that

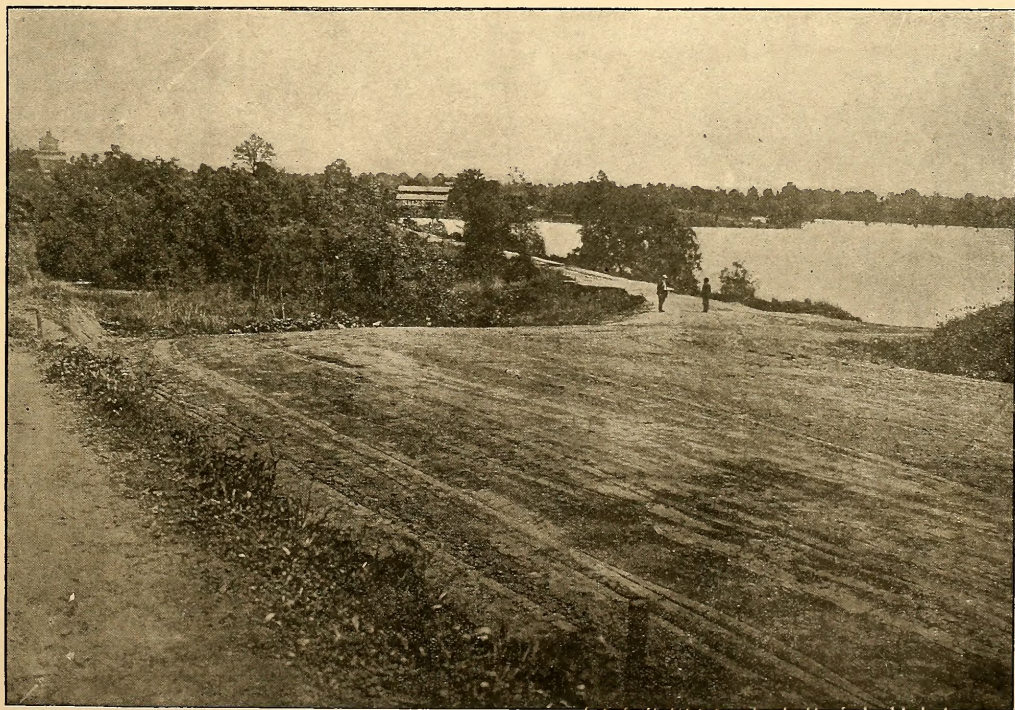
politics are as active there as in the local subdivisions. During the past ten years there have been changes in the control of engineering work in the State highway departments of Arizona, Connecticut, Delaware, Maine, Maryland, Michigan, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Washington, and West Virginia. In the state of New York alone nine changes have been made in the State highway department in the last fifteen years. While it would be unfair to characterize all of these changes as unjustifiable, it is evident that the tenure of office is as a general rule insecure, that the official who should be absolutely free from political control is almost totally unable to act except at the dictates of those very forces. A conspicuous example of the shortsighted policy in effect under the political system is that of a certain State which a few years ago had a capable engineer employed as State highway engineer at \$2500 a year. A political change took place and this man who had given honest and capable endeavor to the work was ousted and a local official put in his place. The experiment did not prove successful and the state concluded to go back to its first choice. In order to do this they were compelled to reverse their judgment and not only reinstate the first man but double his salary.

Recapitulating briefly the intrinsic defects of our present systems of road administration, I may say that they are first, extreme localization involving the maintenance of an unnecessarily large number of officials whose duties are similar and whose responsibilities are exceedingly vague. Second, the practice of requiring these officials to devote only a small fraction of their time to the work, thereby giving to the roads an ir-

regular and intermittent attention. Third, the failure on the part of legislation of regulation to require that the officials who have direct charge of road construction and maintenance shall possess the qualifications essential for their work. Fourth, a general prevalence of the elective rather than the appointive plan, thereby giving an undue advantage to the politician as compared with the engineer. Fifth, the limiting the time of office of road officials to definite terms rather than to the full period of their usefulness. Sixth, the influence of political considerations in determining the location of road improvement, the filling of offices, the making of appropriations and the general conduct of the work. These defects, as I have already stated, are not absolutely general throughout the United States. I understand that the merit system governs to some extent the road administration in several of the states, notably New Jersey and Massachusetts, and there are several of the state highway departments in which the state highway engineer or commissioner is appointed by a non-partisan board, but these instances may be cited as exceptions rather than the rule at the present time, and in some of these cases, the letter rather than the spirit of the merit system has prevailed.

Having diagnosed the disease, it remains for a remedy to be suggested. That remedy to my mind is the enactment of strict and clear-cut civil service legislation applicable to the entire road system in each state, and the conscientious and wise enforcement of such legislation. In the first place, a state highway engineer should be chosen by a non-partisan board and should hold office at the discretion of such a board. All sub-

ordinate positions in the department should be filled by rigid competitive examinations without regard to party affiliations. At this point I wish to call attention to the fact that we have recently filled the office of assistant director of the United States Office of Public Roads by such a competitive examination and practically our entire force from messenger boy to Director is filled in the same way by competitive examinations. The results are infinitely more satisfactory than the old spoils system, but this fact is so apparent to all students of the subject that I am merely wasting time to restate it. In regard to county and township road work, I think it would be advisable, wherever the system of government permits, to have the county as the smallest unit of administration, and to have one official who is required by law to possess a practical knowledge of road construction and maintenance, and who is appointed after examination, to be prescribed by the state highway department in co-operation with a state civil service commission. While it would probably be necessary to give the county board of commissioners or such officials as have charge of county affairs, the power to remove this road official, they should be compelled to appoint his successor upon certification from the register of the eligibles established by the state highway department and the state civil service commission. This would prevent removal of road officials for the purpose of substituting local politicians and would tend to permanency of office on the part of competent men and to easy removal of incompetent men. There should be provided by legislation and regulation sufficient compensation for the county road officer so that



Same scene near Baton Rouge, Louisiana, after improvement. The expenditure of a few thousand dollars transformed an eyesore into a beauty spot, and made a beautiful drive-way out of a bog.

efficient men might be attracted to the work. Constant employment should be given and his subordinates should be capable men supplied in accordance with the spirit of the merit system. The objection has been made to the employment of county engineers, that some counties are utterly unable to pay a salary such as a competent engineer would require. This difficulty can be overcome in two ways, first by having legislation so framed as to permit two or more counties to jointly employ an engineer, or, second, to make the civil service regulations sufficiently elastic to enable a practical and efficient superintendent to be employed rather than a high-salaried technical engineer where conditions would appear to warrant it. Only when we arrive at that state of development where we recognize in the fullest degree the necessity for the application of the merit system in road administration in every unit of government, will we attain that standard of excellence in our public roads which would make them comparable to the roads of Europe.

I hope this distinguished body will actively join in the good roads movement, not for the purpose of urging larger expenditures, not for the purpose of urging national aid, not for the purpose of developing better methods of construction and maintenance, but for the distinct purpose of seeing that this great public trust is administered for the benefit of the public and as an example of civic righteousness and good management. From the monetary standpoint alone the introduction of the merit system will effect a saving of at least \$50,000,000 a year, and I consider the monetary saving but the smallest part of the great possibilities in this movement. I would like to see the National Civil Ser-

vise Reform League represented at the Fourth American Road Congress which will be held in the city of Atlanta next October or November. I would like to see this great organization in complete charge of a session of the congress devoted solely to civil service reform in road administration, and if anything can be done at this meeting looking to such participation, I earnestly hope that the opportunity will not be passed over.

D. A. R. Disapproves of Shackleford Bill.

The national old trails committee of the Daughters of the American Revolution, in session at Kansas City last month, denounced the Shackleford good roads bill as a "pork, barrel" measure and decided to immediately appeal to the 100,000 member of the D. A. R. throughout the country to telegraph their senators to vote against the bill. A petition also was drawn up to be sent to President Wilson.

The committee objects to the placing of federal funds in the hands of the governor of each state, who, in turn, will distribute the money through minor officials.

Five miles of the Central Avenue Turnpike in Knox county, Tennessee, was repaired in one day by the citizens on the co-operative plan. The county delivered the stone to the citizens, and under the direction of George T. Fenton, P. A. Haynes and Lee Wallace the citizens hauled the stone and repaired five miles of road leading into Knoxville.



Working the Raags of Good Roads Days in Kentucky. : Reading from left to right, the white workers are: Wiley Marshall, J. M. Kendall, (in background,) Governor McCreary, Col. Noel Gaines, R. C. Terrell, Commissioner of Public Roads.

A General Review of the Road Situation in Kentucky

HON. ROBERT C. TERRELL, commissioner of public roads of the Commonwealth of Kentucky, sends *Southern Good Roads* a very interesting article on the road situation in Kentucky. Concerning it he says:

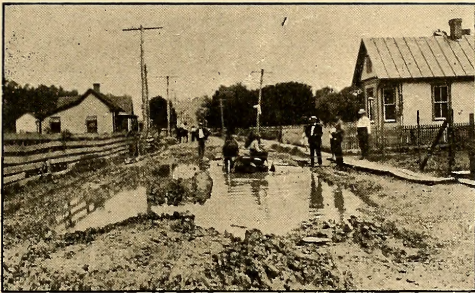
"I am enclosing you an article which appeared in the *Times* published at Louisville, Kentucky Saturday, January 31st. This article very concisely states the position of those who are favoring state aid in Kentucky."

There was a time when the Commonwealth of Kentucky, according to the government statistics, had more miles of road possible to negotiate at all seasons of the year than any other state in the union—but this is no longer true. Also, in those years of the long ago when Kentucky's white and glistening turnpikes were the

of the dreamer. And yet such a system is not only easily possible, but now seems not unlikely when one considers the wonderful possibilities of state aid and federal aid for good roads, such as is being furthered and fostered by state and national statesmen of the foremost rank. These men have taken an important lesson from the book of ancients, who realized that no man may expand, no man may develop who confines himself to one narrow valley or cove, and that no matter how completely the wanderlust may invest one's mind he cannot acquire many new ideas nor much of the world's advantages if he must spend all his time struggling with the natural obstacles to travel.

The plan of federal aid is too well known to require discussion. From the annual appropriation of \$25,000,000, the Commonwealth's share will be \$583,000 when the requirements shall have been fulfilled. The requirement is a state tax of only five cents on each \$100, which would produce a revenue of \$600,000 annually, producing from these two sources \$1,183,000; which when supplemented by taxes from the counties of an equal sum would provide \$2,366,000, or a sufficient income to build within eleven years 6,200 miles of real road, connecting every county seat in Kentucky with every other one and absolutely banishing the stigma of "pauper county" from the confines of the Commonwealth.

The excellent map shown herewith and drawn for the *Times* by S. E. Cook, of the class of 1915 in State University, and passed upon by Prof. D. E. Terrell, of the University School of Road Engineering, displays in plain sight that noble network of highways upon which Kentucky could depend for the banishment of illiteracy, poverty and apathy. The possibilities of such a system are too great to be overlooked by even



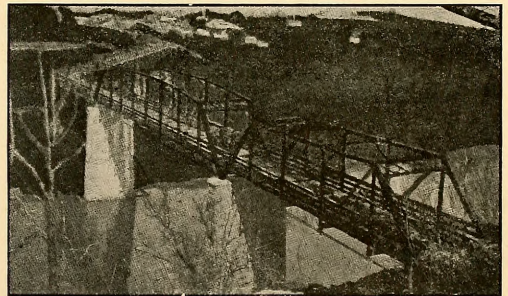
Bad road, Paintsville, Kentucky, afterwards improved with macadam.

boast of the Commonwealth and a living justification of the life and works of the inventive MacAdam, envious ones from all other sections turned their eyes toward Kentucky with envy—but this is no longer true. Kentucky, though not the state worst off for roads, is miserably failing to realize her manifest destiny commercially, educationally and industrially, largely because her system of highways offers no encouragement to that intrastate barter and trade which is one of the great foundation stones of big commerce.

So many, many times have the resources of the Commonwealth been counted and recounted in these columns that it seems useless at this time to enter into a detail of the magnificent possibilities which Kentucky offers her sturdy sons and capable daughters. Her opulent bosom holds forth bounteous offers to the lumberman, the miner, the farmer, the brick-maker—in fact, there is all that wonderful resource which nearly all Kentuckians must have heard of and read of ad nauseam, for the past three decades, but there is very little to be derived from all this until each county seat shall be linked with every other county seat by a road—not a creek bed nor yet a long-drawn slough, but by a real road, a road such as shall be passable at all seasons of the year to all vehicles of any description whatever, from the motor car of commerce or pleasure to the ox wagon bearing its burden of saw logs or grain.

System Easily Possible.

A few years since to speak or even to think of such a system of highways would have placed upon even the most ardent and confident Kentuckian the hallmark



New Highway Bridge at Munfordville, Ky.

the most callous. Industrial salvation is to be found there and those roads, when in good time there can be little doubt they will be completed, will give to every man and woman, to every little boy and girl, now proud to boast their Kentucky birthright, something real and tangible to boast. Even the glories of ancient Rome were based more upon that wonderful network of roads which gave access to the then entire civilized world than upon the victories of all her legions.

The movement for good roads in Kentucky has been going forward for many years, but at times its progress became almost imperceptible, and save for the fact that



GOVERNOR JAMES B. McCREARY, OF KENTUCKY.

Kentucky's State Department of Public Roads

By HON. JAMES B. McCREARY
Governor of Kentucky

A STATE Department of Public Roads was advocated by me when I was a candidate for Governor of Kentucky. After I was elected I recommended in my message to the General Assembly the enactment of a law providing for a Department of Public Roads, and an appropriation and a proper and comprehensive act was passed,

The people of Kentucky are in favor of good roads. They know that good roads mean a decrease in the expense of hauling products to market and in getting goods home from the place of purchase. They know that good roads increase the value of farms, mean better access to schools and to churches, and better and more attractive environments.

The Commissioner of Public Roads appointed by me has been active and successful in his organization. He has sent bulletins and literature and has furnished plans and specifications and estimates of cost for many bridges and made many surveys for sites, assisted in road and bridge building, and the sentiment in favor of public roads has been greatly strengthened.

The law creating the Department set aside from the license tax on automobiles, which constitutes the State Road Fund, the amount which has been necessary to make the road service efficient.

The new Road Law in Kentucky has met but little opposition, and where it has been given a fair and impartial trial by county officials, and the county road engineers have been given an opportunity to perform their duties unhampered, it has been entirely satisfactory.

The State of Kentucky no doubt will continue the progressive policies so successfully instituted.

A system of good roads is the basis of the country's progress and upon this largely depends its material development and prosperity. Public roads have been compared to the veins and arteries in the human body, by which the circulation is carried on, and when they are clogged, or are not in good condition, the usual functions are impeded and vitality diminished.

I am in favor of the United States Government aiding, to a proper extent, in the building of roads. Large amounts of money are appropriated annually by Congress for rivers and harbors, for irrigation and for government buildings, and in the same line Congress should appropriate money to aid in the construction of public roads.

the economic value of highways has become a recognized principle one cannot boast that much has been done to provide the state in general with roads of any great serviceable value. Of late, however, the principle has become too big a thing to be kept out of sight, and the Times along with other great elements in the welfare of the Commonwealth has brought to the public eye the need of a system of communication better than any other in the country.

Terrell Leads Fight.

Leading the fight in the general assembly is to be found the sturdy figure of Claude B. Terrell, Speaker of the House of Representatives, a resident of Trimble county and a man of the soil, who would see the country dweller, the farmer and the stockman getting more out of life and getting it easier. There is no limit to the improvement in the conditions of living possible when means of easy transportation of crops and incoming comforts are at hand.

These things being known to the Speaker, he has put his heart in the cause of state aid for good roads. He knows that the locked-in treasures of the mountains will enable those counties, long supported by the balance of the state as "pauper," to take their self-respecting place amongst those honorable and honored counties which pay their own way—that is, when roads are built which will afford ingress and egress to the groaning wagons which shall bear outward the produce of those hills and valleys, and which shall bear in the increased comforts of the outside world. It is for reasons such as these that Speaker Terrell is in the thick of the fight for state aid for good roads.

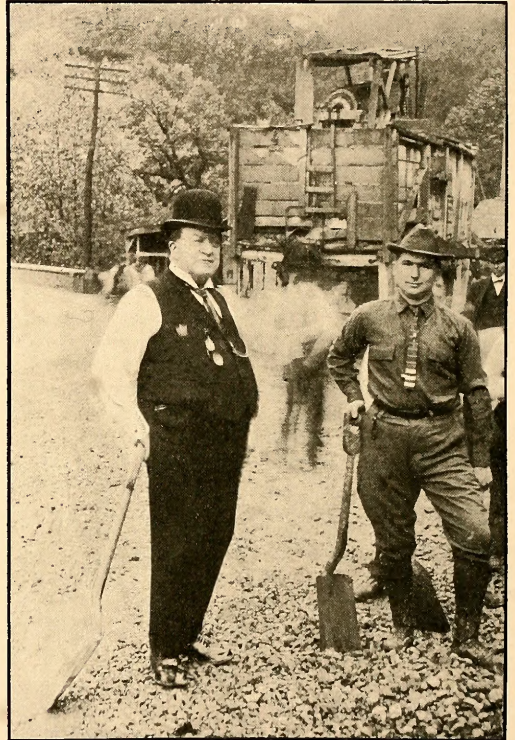
The entire Commonwealth of late years is all agog over education—as well it may be with all the advantages of a wise and intelligent citizenship in the near future—wise and intelligent as a whole people instead of in favored spots only as heretofore. There is no cause which may be so greatly fostered by good roads as that of education for all the people, for how can a little boy go to school when it is more than a Sabbath's day's journey from his home under present road conditions to the school house five or ten miles away? Already in those counties where good roads exist and always have existed, the consolidated school is performing its varied functions, and children are taken to their studies in communal vehicles, and returned at nightfall full of the pleasure and profit of a hard day's work with their books.

For the 6,200 miles of good roads which eventually will unite the county seats of the Commonwealth in a coherent and responsive whole as the nerves co-ordinate the functions of the various members of the human body, there will be required \$2,366,000 yearly for eleven years. As the rate of \$4,000 per mile for the roads as proposed to be built, this would give the state over 591 miles per year average—something very tangible for the people, to regard while impatiently looking forward to that glad day when the entire 6,200 will be available for the public use and benefit. What vistas of new thoughts and new opportunities these highways would open up can be left safely to the imaginations of the people themselves.

It is not only in what are commonly considered the isolated places of the state that lack of highways shut in the people and rob them of their right to live and prosper in their pursuit of happiness. In many counties there are sections absolutely inaccessible to wheeled vehicles in rough weather, and, in order to carry this argument to its fullest, it must be told that the wealthy county of Jefferson has some mud paths which would do justice to the poorest of mountain communi-

ties. This is true for the very good reason that there are so many communities clamoring for roads and more of them these enlightened days that even the wealthy county of Jefferson cannot keep up with the demand. It is because of all these facts that Speaker Terrell, born and reared in a country community, wants roads for the people of the Commonwealth, and will give thought and labor to cause the construction of good roads through state aid for the enterprise.

There can be no doubt that one good reason why more Kentucky lowland capital is not invested in the development of Kentucky resources is the fact that especially in the mountains the virgin lands far from railroads are hard to get to, and few are the capitalists of

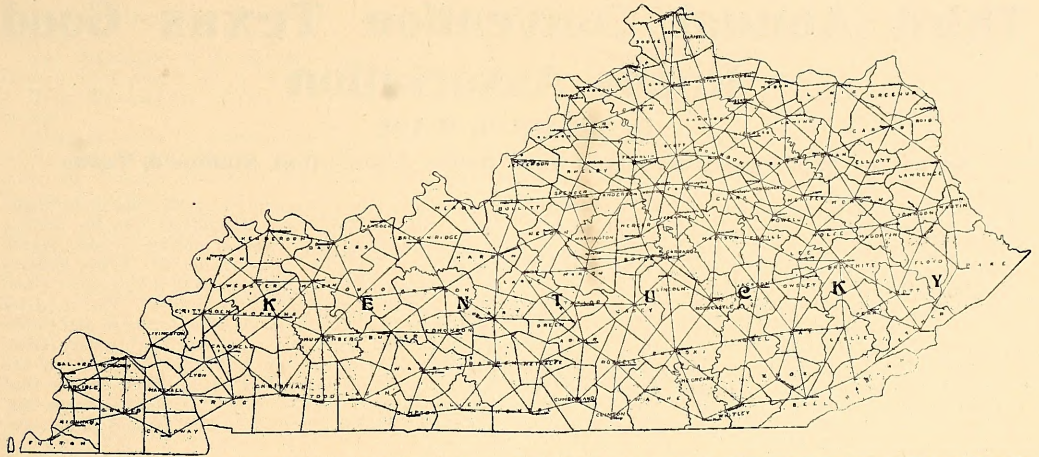


Governor McCreary and Mr. R. C. Terrell, Commissioner of Public Roads, of Kentucky, working the roads on "Good Roads Day"

sufficient physical endurance and leisure to spend days prospecting through country which should be intersected by roads, so that the land might realize its value and the people of those lands might pay their taxes and shake off the stigma which must ever cling to those counties which cannot pay their way in the conduct of the affairs of the great Commonwealth of Kentucky.

Whole State Livable.

It is the truth that there is no nook or corner of the state which is not adapted to the support of human life, and all students of the question are agreed that in all parts of the state the various activities which are now in practice not only will support life, but can contribute something of a surplus to the needs of the world—that surplus representing profit, and profit represent-



Highway Map of Kentucky, Drawn by Mr. S. E. Cook, of the State University, Class of 1915, and Approved by D. V. Terrell, Professor of Highway Education in the University. The measurements are taken on straight lines, the engineer proceeding upon the assumption that the roads already built will amount to the extra mileage necessary to take care of the curves

ing comfortable old age, and a chance for the children to better their condition—to live happily and feel at the end that they have not been deprived of anything to which they are entitled. Where no roads exist it frequently has been shown that man will produce no more than his needs, and often will take no great care to produce that much, having little incentive to labor when labor represents no advance, but only toil.

How many thousands of times has it been said that in the hoarded stocking fund of the peasantry, France finds the wherewith to defend her borders or to develop her colonial resources? That is no matter. It is very generally known that the wealth of France is held by the farmers of France, and those farmers are men to whom 100 acres of land would seem a vast estate. How do they happen to have money? Because they have markets. And markets are impossible without roads. Some experts contend that there are better roads than the roads of France and make great argument upon it. This doesn't make great difference, either. It is sufficient that France is cobwebbed by perfect highways, and what the people produce they can sell, and without any unusual expense or toil. They receive actual money for their produce, and they care not that they are taxed for the maintenance of the roads, for without the roads there would be no market, and with no market no money.

As to the Cost.

When it is shown what Kentucky's state tax rate is at present and what it would be with state aid for good roads, it seems absurd that there should be any question raised as to the merits of the plan. Kentucky now pays \$5 per thousand in state taxes, and would pay \$5.50 under the proposed system. Not much of an increase. Arkansas pays \$21.70 per thousand in state taxes, and we never hear that the people of Arkansas are thinking of emigrating in order to escape the burden. Washington state requires \$36.39 per thousand, and that state drains from Kentucky a goodly percentage of its immigrants. Kentucky has no bonded debt and is otherwise free from drawbacks to state aid for good roads. In other words, it is stoutly contended by everybody interested that there is no excuse for the existing condition.

Supporting Speaker Terrell in his work for state aid

can be found the entire legislative delegation from Jefferson county, the members of which are absolutely pledged to this principle, and who will continue to labor in its behalf with high hopes of success during the present session of the general assembly. The cost is comparatively so little and the possibilities for the state so great that no member of the Louisville delegation has given more than a passing thought to the fact that Jefferson county will have to bear a very large share of the burden of taxation. With Speaker Terrell they believe that at such a time, when the basic interests of the Commonwealth are at stake, sectional consideration should be laid completely aside.

Hon. Oscar Underwood One of the Original Advocates of Federal Aid.

In these days when everybody is for federal aid in road-building and many are claiming to be the original federal aid boosters, it is worth noting that about eight years ago, Mr. Underwood, the distinguished democratic leader of the house of representatives, who is an active member of the Alabama Good Roads Association, and one of its vice presidents, in advocating national aid, said:

"There is not an inhabitant of Alabama who is not entitled to have his mail delivered at his door by the government to whom he has granted this power, whether he lives in the city or the country; and it is no answer to the demand for a fair delivery of the mail matter to all that the county roads are so bad that the mail carrier can not travel them, when this very government that is delivering the mail has been granted the power and directed by the constitution to build suitable post-roads for mail deliveries to all.

"Some contend that the state and county governments should provide the roads over which the United States mail is carried. It is true this has been done in the past, but does not seem to me that the argument is a tenable one. Why should the grant have been given to the federal government to build post-roads if it had not been intended that it should exercise that grant of power? To establish post-roads must mean something more than merely using roads for postal service after somebody else built them."

Third Annual Convention Texas Good Roads Association

By HOMER D. WADE

Secretary and Treasurer, Texas Good Roads Association, Stamford, Texas

THE third annual convention of the Texas Good Roads Association convened in Fort Worth January 26th-27th-28th and was declared by those in attendance to be the most successful good roads meeting ever held in the state or in the southwest.

Particular attention was given to the earnestness and close attention of the five hundred delegates in attendance and the execution of the practical program. The different phases of the subject were discussed from the standpoint of the laymen, as well as the expert, and the presence of representatives of the two most powerful womans' organizations in Texas were delightful features of the meeting.

The delegates were made up of men and women of every walk of life and they came to be benefitted.

A large number of county officials, road supervisors and highway engineers were present and the interchange of ideas, as well as technical and practical information given, was thoroughly appreciated by every one present.

The convention was held in the splendid auditorium of the Chamber of Commerce building and every facility was afforded for the convenience and pleasure of the delegates.

Hon. R. F. Milam, mayor of Fort Worth, delivered the address of welcome, President J. W. Warren having called the meeting to order, and it was a most happy and practical address. The mayor took occasion to admonish aspiring office seekers that it was the practical side of economics that was appealing to the public and warned them to advise their constituents how they felt upon this subject.

Hon. Mason Maney of Pearsall, Texas responded to the address and declared that there was no greater economic question before the people than that of improved highways.

Following these two addresses, President Warren delivered his annual address, showing the rapid growth in interest, demonstrated by bond issues that had been voted during the past year.

He urged that the Texas Good Roads Association should be put on a strong financial basis and pointed to the good that had been accomplished by the same.

Following these addresses reports were made from some fifteen or twenty counties, as to the progress that is being made and all were most favorable.

The afternoon session was devoted to addresses by Col. Sidney Suggs, highway commissioner of Oklahoma, who entered an economic appeal for business principles to be applied in road building and Judge O. E. Dunlap, former president of the Texas Bankers' Association, who showed by facts and figures that improved roads was an economic measure.

The rest of the day was given to a school of instruction on road building, conducted by Prof. R. J. Potts of the Highway Engineering department of the A. & M. College of Texas.

The time was utilized as a round table discussion and the delegates remained until six o'clock to discuss the great problem.

The second day's session was even more instructive. Mr. D. E. Colp, Secretary of the Bexar County High-

way League, outlined plans for conducting good roads campaigns and following his address was the feature of the convention. This was an address by Mrs. March Culmore, of Houston, representing the Texas Federation of Womens' Clubs, who spoke to the subject "Good Roads and their relation to the Home." The audience was swept from their feet as Mrs. Culmore made stirring appeals to the men to rescue the country home from the distress of poor highways. She urged the men to continue their good roads' days, saying that the women were unable to do the manual work, but that they would prepare their lunches, and show them the mud holes.

Mrs. C. W. Hutchinson, of Fort Worth, president of the Texas Mothers' Congress and Parent Teachers' Association, followed Mrs. Culmore in a magnificent address along the same lines.

Hon. W. A. Alsdorf of Ohio, general organizer of the National Highways' Association, was present at this time and delivered a masterly and economic address, dealing with the good roads' problem, taking for his subject "The Need of Good Roads Everywhere."

The afternoon of the second day was a most instructive one. It opened with a scholarly presentation of the subject of good roads to education, delivered by Hon. F. M. Bralley, ex-state superintendent of public instruction. This was followed by a most practical address delivered by Hon. Ed. R. Kone, commissioner of agriculture, which made a splendid impression.

The rest of the convention was given to the school of instruction on good roads, same being conducted by Prof. R. J. Potts and Geo. D. Marshall, of the Bureau of Good Roads, of the department of agriculture.

The evening of the second day was used by Thos. J. Tynan, of the Colorado penitentiaries, in showing by slides and motion pictures the system used in that state in working convicts upon the public highways.

The morning of the 3rd day was given to an inspection of the Tarrant county roadway system, now being built in which the expenditure of one million, six hundred thousand dollars is involved.

The Fort Worth Automobile Club supplied automobiles for the delegates and they were under the personal chaperonage of P. C. Travilla, engineer in charge and E. E. Edwards, secretary of the Fort Worth automobile club.

The afternoon was given to a business session.

The committee on ways and means recommended that \$6000 be raised for the maintenance of the association during the ensuing year and over \$3000 of this was subscribed at once.

Elect Officers for Year.

The nominations committee, consisting of J. A. King, Albany; E. E. Edwards, Fort Worth; B. B. Buckridge, Temple; G. W. Keeling, Camp county; A. C. Odle, Meridian, submitted the following for officers, who were unanimously elected by the convention:

John D. Warren, San Antonio, president; W. G. Turner, Fort Worth, first vice president; Homer D. Wade, Stamford, secretary and treasurer; D. E. Colp, San Antonio, first assistant secretary and treasurer; R. J.

Potts, Agricultural and Mechanical college, advisory engineer.

Vice Presidents—E. F. Lanham, Bell county; O. E. Dunlap, Ellis county; G. W. Keeling, Camp county; J. A. King, Shackelford county; J. W. Madden, Grayson county.

Directors—John D. Warren, San Antonio; E. E. Edwards, Fort Worth; Mason Maney, Pearsall; D. E. Colp, San Antonio; Homer D. Wade, Stamford; W. G. Turner, Fort Worth.

Board of Councilmen—G. W. Baker, Dallas; Tom W. Larkin, Beaumont; R. J. Potts, College Station; W. M. McFarland, Alpine; J. W. Warren, San Antonio; D. E. Colp, San Antonio; E. W. Kirkpatrick, McKinney; E. E. Edwards, Fort Worth; J. D. Stephenson, Hillsboro; D. B. Tallay, Wichita Falls; "Split Log Drag" Hill, Cleburne; W. W. Sealy, Waco; James Rooney, Fort Stockton; Ben B. Cain, Eagle Pass; O. L. Sims, Paint Rock; J. C. Howerton, Cuero; C. H. Mc Masters, Galveston; Joe Hirsch, Corpus Christi; H. C. Odle, Meridian; Seth B. Holman, Amarillo; Homer D. Mathews, Houston; Col. D. P. Gay, Brownsville; F. W. Williams, Paris.

Resolutions Passed.

The following resolutions were unanimously passed: Whereas, the people Texas are annually spending millions of dollars in public road improvement, and

Whereas, there is now no state highway department or other competent organization to supervise and direct this enormous expenditure and to standardize the methods and quality of the work, and

Whereas, we are fully convinced that, for lack of thorough and competent engineering advice, many counties and districts are not securing full value in road improvement for each dollar expended, and

Whereas, more than two-thirds of the states in the union now have regularly organized state highway departments, and

Whereas, it seems certain that a well organized and efficient state highway department will be made a condition precedent to any state's securing federal aid should such be given,

Therefore be it resolved that this association consider the establishment of an adequate state highway department to be the paramount issue now confronting the good roads' advocates of Texas, and

Be it further resolved that we do hereby most urgently petition the Thirty-fourth legislature of Texas to establish a state highway department headed by a state highway commission and a state highway engineer, and that such department be provided for on such liberal scale as will at once insure its taking rank with the most dignified and important of our state departments.

Resolved, that the Texas Good Roads association heartily favors the adoption of some practicable plan under which state convicts can be used in the construction of good roads and in the preparation of materials for good road construction, and we urge upon the state legislature immediate action looking to this end.

Resolved, That this association favors a constitutional amendment permitting counties and good roads districts to issue road bonds on a majority vote instead of a two-thirds majority vote.

Whereas, There is now pending in congress a bill known as the Lever bill, which is designed to extend to the general public the benefits of agricultural instruction as given by all leading agricultural colleges, and

Whereas. The building of good roads is absolutely necessary to the best progress in all lines of agricultural improvement; therefore, be it

Resolved, That it is the sense of the Texas Good Roads association, in annual convention assembled, that said Lever bill should specifically mention good roads as one line of work to be covered by said bill, and that the president and the secretary of this association are hereby instructed to send a telegram to each of the Texas members of the United States senate urging them to propose and advocate an amendment to said bill which will adequately provide for the diffusion of knowledge on the construction of good roads.

Resolved, That we heartily favor the passage of legislation looking to the elimination of narrow-tire vehicles, to the end that our roads, when once constructed, may be the better preserved.

Whereas, Certain unscrupulous persons are taking advantage of the great popularity of the good roads cause to obtain money for unknown and questionable road organizations, therefore, be it

Resolved, That the public of Texas is hereby especially warned not to pay money to any representative of supposed good road organizations not located within their county, unless such representative presents proper credentials bearing the approval of the president and the secretary of the Texas Good Roads association, and we call on the press of the state to give special publicity to this recommendation.

Resolved, That the Texas Good Roads association desires the help and support of all good roads organizations both within and without the state, and of all civic organizations.

In this connection we wish to make especial mention of the National Highways association and to express our hearty appreciation of the substantial donation made by said organization for the advancement of the work in Texas, and we hereby endorse the action of our directors in amalgamation with the association.

Whereas, A resolution has been introduced in the United States senate to appropriate \$25,000 for the purpose of making a survey and an estimate of the cost for the building of a military highway along the Rio Grande border of Texas, and

Whereas, Such a highway is of pressing necessity, now, therefore, be it

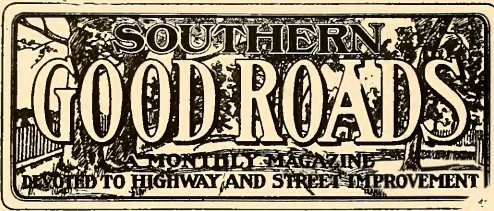
Resolved, by the Texas Good Roads association, That we most heartily indorse the movement to urge upon the federal government the necessity of constructing such military highway and call upon our two senators and the entire Texas delegation in the United States congress to work for and press such a measure; and be it further

Resolved, That the secretary of this association be and he is hereby requested to mail each of our senators and congressmen from Texas a copy of this resolution and furnish a copy of same to the press of the state.

Resolved, That the Texas Good Roads association express its deep appreciation of the splendid hospitality of the city of Fort Worth, the Chamber of Commerce, the Automobile club and the officials of Tarrant county.

Resolved, further, That we extend our thanks to the press for their assistance in making this meeting a success and for carrying to the state at large such excellent reports of the work here done.

Resolved, further, That we thank and commend the officers of our association for their untiring efforts and congratulate them upon their ability and success in the work.



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1313, Marquette Bldg, CHICAGO, ILL.

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Official Organ of the North Carolina Good Roads Association

HENRY B. VARNER, President, Lexington, N. C.
DR. JOSEPH HYDE PRATT, Secretary, Chapel Hill, N. C.

Official Organ Southern Appalachian Good Roads Association

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HENRY B. VARNER, Secretary, Lexington, N. C.

Official Organ of the South Carolina Good Roads Association

F. H. HYATT, President, Columbia, S. C.
FINGAL C. BLACK, Secretary, Columbia, S. C.

Official Organ of the Virginia Road Builders' Association

C. B. SCOTT, President, Lynchburg, Va.
C. L. SCOTT, JR., Secretary, Harrisonburg, Va.

VOL. IX. MARCH, 1914. No. 3.

**THE SOUTHERN NATIONAL HIGHWAYS
ASSOCIATION.**

Elsewhere in this issue appears a letter from Col. Dell M. Potter, president, and Mr. D. Rodney Ellis, secretary, announcing the adoption by the board of directors of Southern Good Roads as the official organ of the Southern National Highways Association.

This action is a very high compliment to us and we thank the officers and directors of this great organization for it. We have stood ready from the beginning to put forth every effort and use every power at our command to further this project, and by way of showing our appreciation of the honor that has been conferred upon us, we can only assure Colonel Potter and his associates that we will continue to work for it zealously and faithfully.

A STATE ORGANIZER.

Miss H. M. Berry, editor of our North Carolina department, announces this month the appointment of a state organizer for the North Carolina Good Roads Association. Mr. D. Tucker Brown, formerly with the Virginia state highway commission, an expert road

builder, as well as an expert organizer, has been selected for the place and he has started work in a way that greatly pleases the officers of the association.

Mr. Brown stands ready to give expert advice on road questions of all sorts in all parts of the state and during February received calls from several different counties. He has assisted the road authorities of New Hanover, Columbus, Warren and other counties and has made a number of effective speeches.

We hope that the example of the North Carolina Good Roads Association will be followed in other states and that it will be but a short time until all of them will have expert organizers on the job.

STATE HIGHWAY DEPARTMENT FOR GEORGIA.

The state of Georgia, which is setting a pace in road building that the rest of the South finds hard to follow, has no state highway department. The work in Georgia is left to the counties and there is no attempt at state supervision of road and bridge work. Inasmuch as few counties of Georgia have had the wisdom and foresight to employ skilled highway engineers to direct the expenditure of road funds, it naturally follows that a great deal of money has been wasted and is being wasted.

A better day is in sight. The good people of Georgia are beginning to realize the need of an intelligent, powerful central board to direct the expenditure of road funds and to make possible a system of inter-county highways. Bills are being prepared for introduction at the next session of the Georgia legislature that will provide for a state highway commission and a measure of state aid in road building. It may be impossible to secure the passage of a progressive, up-to-date state aid road law now, because our Southern legislatures act very slowly, but it is practically certain that a forward step will be taken. The good roads advocates of the state expect to secure the passage of a law providing engineering assistance for the counties of the state, if nothing more.

MR. W. I. LEE RESIGNS.

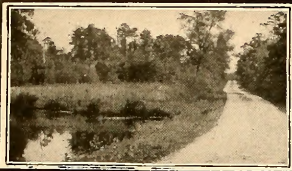
Mr. W. I. Lee, secretary of the Virginia Road Builders' Association and highway engineer of Tazewell county, has accepted the position of highway engineer of Mercer county, West Virginia, and has tendered his resignation as secretary of the association. His successor has not yet been named.

Mr. Lee goes to Mercer county at an increased salary. His fine work in Tazewell attracted wide attention and it is known that a number of mountain counties had their eye upon him. Mercer may count herself exceedingly fortunate. Mr. Lee proved to be a master road-builder in mountainous Tazewell and he may be depended on to do as well in Mercer.

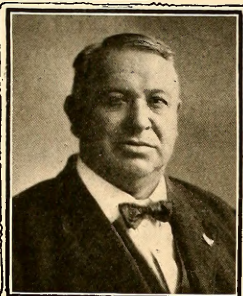
Southern Good Roads regrets Mr. Lee's departure from Virginia because it means that the magazine loses his services as editor of the Virginia department. We wish him continued success in his new field.



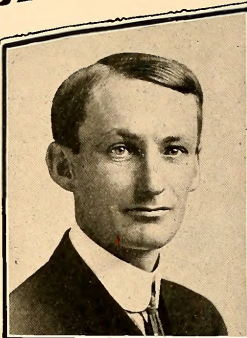
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~ HON. SYDNEY SUGGS ~
OKLAHOMA STATE HIGHWAY COMMISSIONER



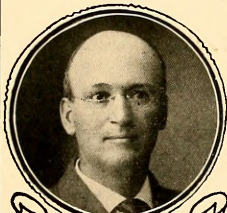
CHARLES J. BENNETT ~
CONNECTICUT STATE HIGHWAY COMMISSIONER



JOSEPH HYDE PRATT ~
N. CAROLINA STATE GEOLOGIST



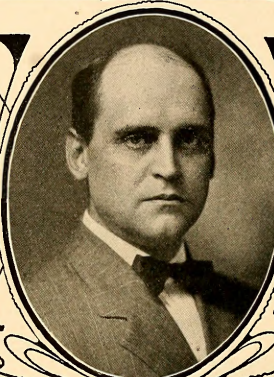
~ W. J. ALABAMA ~



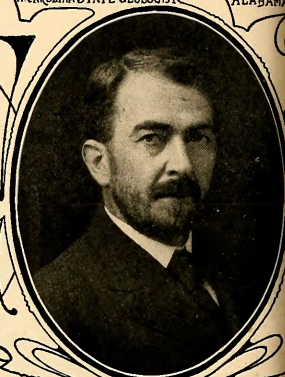
~ E. A. KINGSLEY ~
ARKANSAS STATE HIGHWAY ENGINEER



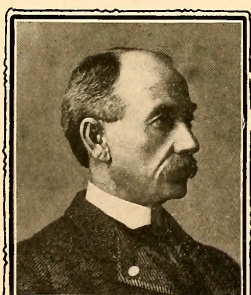
~ HENRY L. BOWLBY ~
OREGON STATE HIGHWAY ENGINEER



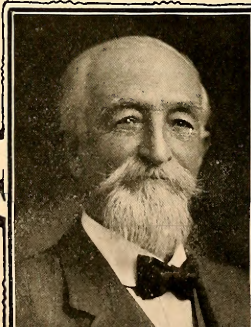
~ A. B. FLETCHER ~
CALIFORNIA STATE HIGHWAY ENGINEER



~ A. M. JOHNSON ~
ILLINOIS STATE HIGHWAY ENGINEER



~ A. J. PARRSHALL ~
WYOMING STATE HIGHWAY ENGINEER



~ GEO. W. GOOLEY ~
MINNESOTA STATE HIGHWAY ENGINEER



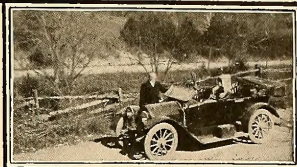
~ PAUL D. SARGENT ~
MAINE STATE HIGHWAY ENGINEER



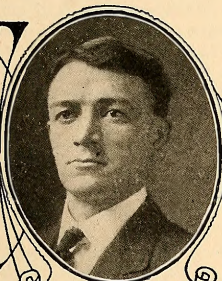
~ E. NORTH CAROLINA ~
AGRICULTURE



ROADS IN VARIOUS STATES



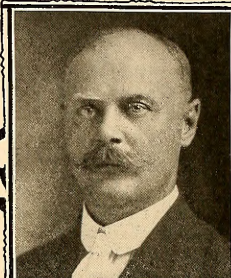
ER ~
ENGINEER



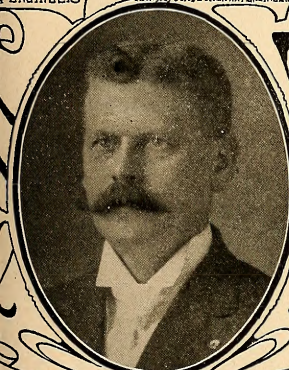
~W.S. GEARHART~
KANSAS STATE HIGHWAY ENGINEER



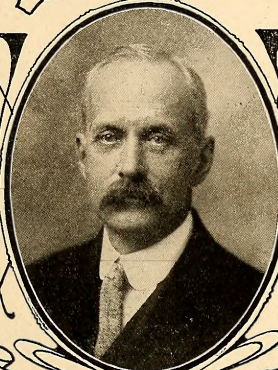
FRANK W. BUFFUM ~
MISSOURI STATE HIGHWAY COMMISSIONER



~JOHN N. CARLISLE~
NEW YORK STATE HIGHWAY COMMISSIONER



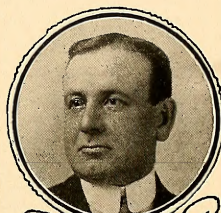
~R. A. MEEKER~
NEW JERSEY STATE HIGHWAY ENGINEER



~COL. WILLIAM SOHLER~
MASSACHUSETTS STATE HIGHWAY COMMISSIONER



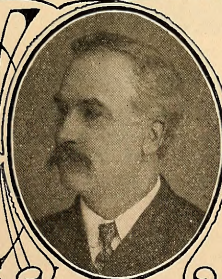
~ROBERT C. TERRELL~
KENTUCKY STATE HIGHWAY COMMISSIONER



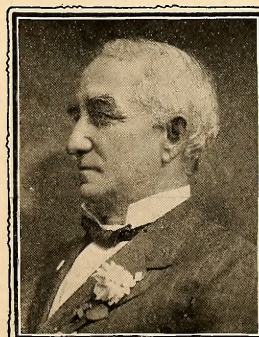
~A.W. MAHON~
MONTANA STATE HIGHWAY ENGINEER



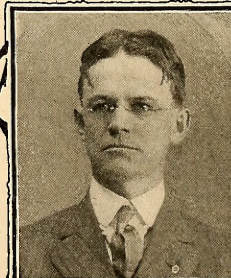
SON ~
SSIONER OF
INDUSTRIES



~CHAS. W. GATES~
VERMONT STATE HIGHWAY COMMISSIONER



~JOHN CRAFT~
ALABAMA STATE HIGHWAY COMMISSIONER



~H. C. BEARD~
IOWA STATE HIGHWAY COMMISSIONER



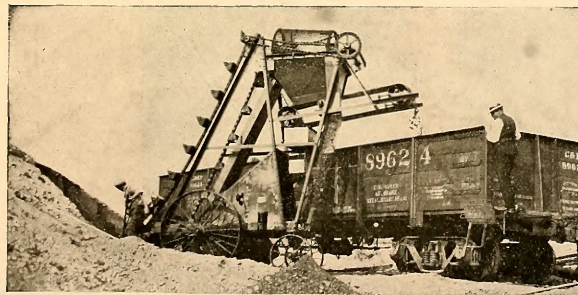
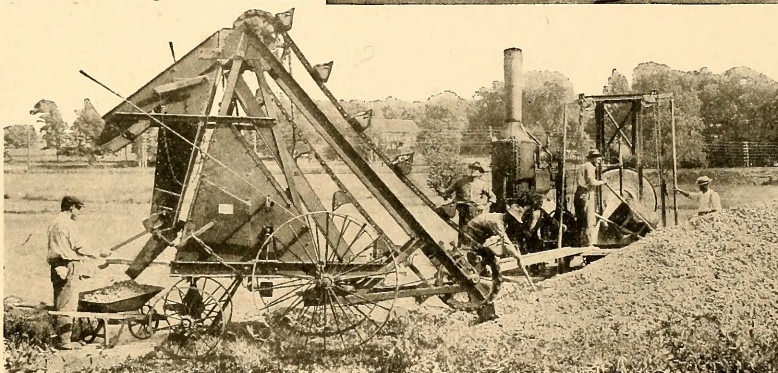
Making the Truck Pay

By H. D. PRATT, Engineer Link-Belt Co., Philadelphia

THE motor truck has come to stay. Its ability to carry bulk material long distances in quantities unheard of ten years ago, and at a high rate of speed, makes it possible to materially reduce the cost of transporting large quantities of stone, coal, sand, gravel, etc. The speed of travel is high as compared with the horse-drawn vehicle. The unloading automatic, the body being dumped by the mere turn of a lever by the truck operator. In many cases the truck is loaded from an overhead chute, but more often the material to be moved lies on the ground in storage piles, not only in regular storage yards, but in streets, roads and wherever most convenient to store. The loading of this material from ground storage piles becomes a different matter. The high cost of loading auto trucks with material carried on ground storage is one of the factors which have retarded the sale of trucks for this work.

The truck which is so quick and convenient for handling several tons at a load, must necessarily be high to hold the load. Shoveling by hand means that the truck spends more than

ers effectively stop this leak. Cut No. 1 shows how. A bucket elevator is mounted on large wheels, and with power supplied by a motor or gasoline engine, will load sand, gravel or coal at the rate of a ton per minute. The truck driver trims the truck with a shovel, and one, two or three men, depending on the nature of the material to be handled, trim and feed to the loader. This combination will load the truck at a cost of 2½ cents



half its time waiting at the storage pile to be loaded, and between trucks the shoveling gang is idle. A good average day's work for a shoveler is 20 tons of gravel, less of stone, and slightly more of sand. Not only is the truck standing idle while being loaded, but the loading by hand costs 8 to 12 cents a ton. Here is a bad leak in what should be an up-to-date and efficient job of handling. The portable wagon and truck load-

ers to 5 cents per ton, the higher cost being that of handling crushed stone, with coal at the low end, and sand and gravel following in order. The saving of about 6 cents per ton thus affected is a large item in these days of close margins and competition, and marks the loader as a useful and necessary adjunct of the motor truck.

There is also a growing demand for a further combination of truck and loader, namely: a truck with loader elevator mounted on the rear end of the body, arranged to lower into a storage pile when the truck is backed up to it, and also to raise clear of the ground when not in use. The elevator is supported independently of the dumping body and is driven through a clutch, by a connection to the truck transmission. This combination results in a truck which can be loaded by its driver with or without a helper in a few minutes, and does away with the necessity for a loader-operator who is idle between trucks.

The loaders described above and shown on this page, are made by the Link-Belt Company, Philadelphia and Chicago.

Concrete Roads Convention in Chicago.

The first annual national conference on concrete road building opened February 12 at the auditorium hotel in Chicago with more than 300 delegates, representing thirty-one states, present. The delegates were received by W. F. M. Goss, dean of the college of engineering of the University of Illinois and chairman of the congress.

The concrete convention was a side issue to the seventh annual cement show, which opened the night before at the Coliseum, and was the first ever held in the United States. Thursday, February 12, was chosen as the opening of both in honor of Abraham Lincoln, whose name has been applied by the promoters of the Lincoln highway association to designate their cross country highway to be built of concrete.

Seven speakers were on the program. They were Mr. Goss; S. E. Bradt, secretary of the Illinois State Improvement association and member of the Illinois state highway commission; O. H. Dunlap, chairman Iowa state supervisors' association; Edward N. Hines, chairman board of county road commissioners, Wayne county, Michigan; Thomas H. McDonald, Iowa state highway engineer, Ames, Ia.; J. T. Voshell, senior highway engineer, United States office of public roads, Washington, D. C., and James R. Marker, state highway commissioner, Columbus, O.

Mr. Bradt and Mr. Dunlap discussed permanent roads in general. The other speakers generalized on concrete construction problems.

Committee reports on a number of technical subjects peculiar to the construction of concrete roads were made in the morning, following the registration of delegates. The most significant as well as interesting of these was the report of the committee on the "Methods and Cost of Repairing and Maintaining Concrete Roads," of which Edward N. Hines of Detroit was chairman.

Mr. Hines' report showed that it cost Wayne county \$1,300 to maintain fifty-one miles of concrete roads for one year.

The committee on the cost of constructing concrete roads, of which A. N. Johnson, state highway engineer of Illinois was chairman, reported the average cost of concrete roads per square yard is \$1.24, the total average being \$1.19. The costs prevalent in thirty states were averaged.

The portrait of Abraham Lincoln looked down upon the exhibition at the Coliseum. It was "Lincoln highway day" at the show. Leaders laid plans for renewing activities toward the completion of the highway from coast to coast.

For an All-Southern Highway Convention at Lake Charles, La.

Mr. John B. Kent, secretary of the Lake Charles, Louisiana, chamber of commerce, is striving to create a state-wide interest in "All Southern Highway Convention" to be held in Lake Charles in April. He is sending out the following letter to organizations all over the state:

I am enclosing herewith a copy of an official call for an All Southern Highway Convention to be held in this city April 7 and 8 and would like to secure your endorsement of this convention along with that of the other commercial secretaries who may be interested.

The plan for an all-southern highway is voiced in the following call:

Whereas the need of a continuous hard surfaced free from toll highway from ocean to ocean through the

south is apparent and its permanent value to the communities through which it would pass generally recognized and admitted, and

Whereas, it is believed that an association broad enough in its scope and purpose to comprehend the entire route as a whole would be able not only to hasten the construction of such a highway but to render invaluable aid in its building and maintenance; therefore be it:

Resolved by the Chamber of Commerce, of Lake Charles, Louisiana, that a convention be and the same is hereby called to meet in this city on Tuesday and Wednesday, April 7th and 8th, 1914, for the purpose of organizing an association which shall have for its main object the promoting of an all southern, free from toll, open all the year round highway from ocean to ocean; and for the transaction any other business that in the judgment of those present may be incident and necessary in the premises.

Resolved further that the governors of the states through which said highway would pass, the country and parish authorities, the mayors of the cities and the commercial, automobile and other interested clubs and associations along the proposed route be and they are hereby invited to be present or represented at said convention and to co-operate with this association in the making of it a success.

Organization of the Tennessee Good Roads Association.

The by-laws of the Tennessee Good Roads Association, which was organized early in January, provide for a board of ten directors, and an advisory board of twenty, to be appointed by the president. A vice-president from each congressional district is also provided for.

The organization of this association has been completed, and is as follows:

Directors—Cyrus Kehr, Knoxville; R. B. Baird, Jellico; T. R. Preston, Chattanooga; T. F. Peck, Nashville; Fred Collins, Milan; J. N. Fisher, Morristown; W. A. Sadd, Chattanooga; P. D. Houston, Nashville; D. M. Armstrong, Memphis; R. A. Dodson, Humboldt.

The advisory board is comprised of the above ten directors, and in addition the following appointed by the president, J. N. Fisher, of Morristown, making a total of thirty members composing the board:

John H. Caldwell, Bristol; R. O. Gallaher, Greenville; George L. Berry, Rogersville; C. L. Hardwick, Cleveland; Ralph Tarwater, Rockwood; John E. Garner, Springfield; L. G. Boxwell, Nashville; Rutledge Smith, Nashville; G. A. Wood, Shelbyville, D. C. Sherrill, Fayetteville; Pitt Hensley, Dickson; E. L. Hampton, Spring City; R. A. Wilkes, Culleoka; Geo. R. James, Memphis; F. N. Fisher, Memphis; W. G. Allen, Cordova; W. W. Craig, Ripley; George S. Boyd, Dresden; W. V. Barry, Lexington; W. K. Abernethy, Selmer.

The districts vice-presidents are as follows:

First district—Gale P. Kyle, Rogersville.

Second district—Arthur Holsinger, Dandridge.

Third district—T. A. Embry, Winchester.

Fourth district—O. K. Holliday, Cookeville.

Fifth district—G. B. Giltner, Murfreesboro.

Sixth district—A. R. Gholson, Clarksville.

Seventh district—W. B. Romine, Pulaski.

Eighth district—G. H. Robertson, Jackson.

Ninth district—W. P. Caldwell, Union City.

Tenth district—A. R. Johnson, Ellendale.

The officers of the association are—J. N. Fisher, president; A. R. Dodson, vice-president; Cyrus Kehr, secretary, and D. M. Armstrong, treasurer.

OFFICERS

Wm. F. Cocke, President
Richmond, Va.

C. L. Scott, Jr., V-Pres.
Waynesboro, Va.

W. I. Lee, Secretary
Tazewell, Va.

C. S. Mullen, Treasurer
Petersburg, Va.

Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

EXECUTIVE COMMITTEE

Hon. G. P. Coleman
Richmond, Va.

Maj. E. H. Gibson
Culpepper, Va.

B. W. Hubbard
Forest Depot, Va.

C. B. Scott
Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

W. I. LEE, secret



ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

Virginia Road Builders' Association.

The fourth annual convention of the Virginia Road Builders' Association at Richmond February 10-11, was the most successful convention this association has yet held. Every session of the convention was well attended and great interest was manifested by the assembled delegates and visitors. There were addresses of great worth by high authorities in the road-building world and special attention was paid to sand clay construction and convict labor.

Hon. G. P. Coleman, the new state highway commissioner of Virginia delivered a very interesting address on "Road Improvement in Virginia." Among the other strong addresses may be noted the following:

"The Valley Turnpike," by Mr. Harry Flood Byrd; "Convict Labor in Road Building," by Maj. James B. Wood, superintendent of the state penitentiary of Virginia; "Road Building from the Contractor's Viewpoint," by John T. McKinney, president of the John T. McKinney Contracting Co.; "Brick Pavements," by H. L. Shaner, city engineer of Lynchburg; "Bituminous Construction," by Charles S. Reeve, chemist, U. S. Office of Public Roads; "Road Building in the Southwest," by Hon. J. W. Chalkley, member of the house of delegates from Wise county; "The Convict and Road Work," by Dr. R. C. Whitehead; "Sand Clay and Top Soil Roads," by F. D. Henley, assistant engineer, Virginia State Highway Commission.

There were other addresses by Dr. Joseph Hyde Pratt, state geologist of North Carolina, B. W. Hubbard, F. M. Schilling, E. S. Finner, and others.

The following officers were elected for the ensuing year:

President, W. F. Cocke, assistant engineer, Virginia State Highway Commission.

Vice President, C. L. Scott, assistant engineer, Virginia State Highway Commission.

Secretary, W. I. Lee, county highway engineer, Tazewell county, Virginia.

Treasurer, C. S. Mullen, Petersburg, Virginia.

Executive committee—State Highway Commissioner, G. P. Coleman; Assistant State Highway Commissioner, C. B. Scott; Maj. E. H. Gibson, Culpepper; Mr. B. W. Hubbard, Buckingham county.

* * *

The Roads Around Petersburg.

W. E. Rosengarten, of the good roads office of the United States Agricultural Department has been in Petersburg making inquiries about the good roads of Dinwiddie, the amount of the city's bond issue for im-

provements of its roads, the amount of work done, etc. The good roads office of the agricultural department some time ago selected ten counties in the United States on which to keep tab. Four of these are in Virginia, and one of them is Dinwiddie. The county has improved many miles of its roads.

* * *

A bill removing from the jurisdiction of Norfolk county supervisors the construction and upkeep of public highways, including all roads and bridges in the county, by placing this branch of the public business in the hands of a bonded commission, of three members to be appointed by the judge of the circuit court, was reported favorably in Richmond by the senate committee on cities, towns and counties. The measure, which has been introduced in both houses of the general assembly has the unanimous support of the county delegation.

Under the present laws the supervisors are ex-officio members of the county road board, the result being that the board of supervisors and the road board are one and the same, except that a separate set of books is kept for each. The proposed act would limit the jurisdiction of the supervisors in highway matters to the perfunctory performance of levying road taxes in accordance with the recommendation of the road commission subject only to levy limitations fixed by the act.

* * *

Surry county, on the James river, between Norfolk and Richmond has caught the good roads spirit as also have nearly all the counties between these two cities, and from now on can be fully counted upon to join in and encourage any movement which will result in the construction of good serviceable roads.

As evidence the Blackwater Good Roads Association has been formed at Dendron, and the following officers elected: President, Dr. J. H. Parker; vice-president, L. W. James; secretary, L. E. Johnson, and treasurer, J. E. Rogers. This organization has as its object the improvement of the road leading from Elberon to the Sussex county line via Dendron, and the furtherance of any movement which has as its purpose the betterment of roads in Surry county.

Messrs. J. E. Rogers, W. H. Pursell and W. L. Devany, Jr., were appointed a committee to confer with the town council and the supervisor of Blackwater district in an effort to enlist their co-operation and financial assistance in the proposed project.

A committee, composed of Messrs. J. H. Parker, L. W. James, E. M. Richardson, G. C. Boothe and James

D. Hart, was named to plan and generally supervise the working of the road.

Great enthusiasm prevailed at the meeting. Many citizens were enrolled for membership, and a tidy sum was raised by subscription to carry on the work.

It is to be hoped that Cobham and Guilford Districts will form similar organizations, thereby creating an interest for good roads in each district of the county.

* * *

Here is an incident showing that the farmers in that section want the motor tourist: Smyth County, aV., or rather the district through which the Bristol-Washington highway runs, voted down a bond issue just before that movement was organized, but after the road was surveyed they voted bonds to build it. Scott county, Va., did the same thing in connection with the Bristol-Lexington highway. Also, the public funds provided were insufficient to build the Bristol-Washington highway from Bristol to Abingdon. Two routes were surveyed, and the farmers on each route subscribed \$11,000, and are building both routes. A Bristol booster was asking a farmer for a one-thousand-dollar subscription and arguing the question of getting to market, etc., and was surprised to get the reply, "I will give \$500 on that road, but if you will get the 'automobile road' by my home place I will give \$1,000."

* * *

Three districts in Scott county, Va., voted in April \$167,100, a part of which will be used to grade and macadamize a portion of the Bristol-Lexington (Ky.) highway through Scott County. Other districts will later vote bonds to carry this road to the Lee or Wise County line. Two districts in Lee County, Va., voted \$66,000 in June, a portion of which will be used to complete the Bristol-Lexington highway through those districts. This makes \$430,000 Lee County is spending for roads.

* * *

Work is progressing very well on the roads in Russell county in charge of Mr. A. H. Pettigrew. The state convict force is now at work on the road between Dickersonville and Bolton. The roads from Lebanon to Honaker via Elk Garden Church and Blackford, have been completed and the work of macadamizing the other roads under way will be resumed as soon as weather conditions permit.

* * *

An election as to the issue of \$130,000 in bonds by the Blacksburg District of Montgomery county will be held early in March. This district is probably the wealthiest in Montgomery county and the roads are in great need of improvement. The board of supervisors have already adopted a resolution agreeing to allow this district the use of a state convict force if the election carries. Should the election carry, it is very probable that the route of the Bristol-Washington highway may be changed to go through Blacksburg district instead of through Christiansburg district.

* * *

Good progress is being made in grading the road from Clintwood, Dickenson county, to the Ford of McClure River, where a connection is made with the C. C. & O. railway. This work is being done by Messrs. W. D. Bunn & Co., under contract. Mr. E. R. Coker, Jr., is Resident Engineer.

* * *

Work has been begun macadamizing the road between Timber Ridge church and Lexington in charge of Mr. S. F. McFadden.

Virginia Good Roads Notes.

Mr. D. W. Lockey has charge of a state convict force improving the Hayes Gap road in Alleghany county.

The state convict force at work in Amherst county under the supervision of Mr. A. P. Eskridge has lately been moved to Pedlar District, where considerable work will be done in grading and macadamizing the road leading up the Pedlar river valley.

Sand clay and soil roads are being built in the vicinity of Appomattox Court House by a state convict force under the direction of Mr. A. P. Eskridge, U. S. Highway Engineer.

A section of very bad road leading out of Huddleston, a station on the Virginian Railway in Bedford county, is being improved by means of state money aid under Mr. W. T. Pollard. Work has been temporarily closed down and will be resumed in the spring.

Mr. E. L. Carter, who has been employed with the state convict force in Amherst county, took charge of the force now at work in Botetourt county on February 1st.

A portion of the Salem Turnpike leading out of Lynchburg is being improved with bituminous macadam. Messrs. J. A. and A. P. McKinney are the contractors and L. W. Wilson is Resident Engineer.

A bridge has just been completed over Chestnut creek near Galax, Carroll county. This bridge was built according to plans and specifications of the State Highway Commissioner and the cost was borne jointly by the state and county.

Considerable improvement is being made in the road between Shawsville and Simpsons in Floyd county. Mr. W. F. Anson is Resident Engineer. This road is in a mountainous section and a number of bad fords are being eliminated.

Mr. G. E. Lemmon, an engineer of experience, has taken charge of the work in Dublin District of Pulaski county. This district has a convict force at work and issued \$100,000.00 in bonds to carry on the work.

A state convict force has begun work on the roads of Rappahannock county in charge of Mr. W. L. Cresap. This county has issued \$94,000 in bonds to carry on the work.

The state convict force in Roanoke county under the supervision of Mr. H. Hocutt will shortly be moved from the road near Hollins College to the road on the north side of Roanoke River between Roanoke and Salem.

A party of engineers in charge of Mr. W. I. Lee will begin work about the first of February on the surveys of the road to be improved under the bond issue of \$167,100.00 which was voted in three districts of Scott county. It is expected that the work will be let to contract early in the spring.

Macadam has been laid from Saltville to Bradford on the road up Rich Valley of Smyth county and the state convict force in charge of Mr. G. H. Dillow is grading and quarrying preparatory to resuming macadam work as soon as the wet weather is past.

Work on the Bristol-Washington Highway in Washington county is being carried on with the state force in charge of Mr. F. M. Jones. The section of the road already completed is one of the best pieces of macadam work in the state.

An election is to be held in Mineral District of Hanover county on February 3rd relative to the issue of \$50,000.00 in bonds for road improvement.

The work is being pushed on the Bristol-Washington highway in southwest Virginia, in Washington, Smyth, Wythe and Pulaski counties.

North Carolina Good Roads Association

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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a
GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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AT THE MIDSUMMER (1913) convention of the North Carolina Good Roads Association it was decided to amalgamate with the National Highways Association. Out of this amalgamation grew the idea of having a State Organizer, who would interest people in this state not only in the construction of state, county and township roads, but in a system of great national highways.

For this work, it is felt that the North Carolina Good Roads Association has been very fortunate in securing the services of Mr. D. Tucker Brown, formerly of the Virginia Highway Commission, inasmuch as he can act not only as a organizer but as an expert road engineer and can assist localities in which he may happen to be in connection with their road problems.

Mr. Brown is a native of the state of Virginia and was born September 30, 1884. He was graduated at the Virginia Polytechnic Institute in 1905, and was engaged as an engineer in railway construction and location until August, 1908. From that time until December, 1911, he was in the employ of the Virginia Highway Commission, his chief work being in the construction of roads. After that he was employed by the Virginia Highway Commission as locating engineer and continued this work until February, 1912. From February, 1912, to January, 1913, Mr. Brown did private work in connection with streets and pavements, principally of concrete foundation with bituminous surfacing. He returned to the Virginia Highway Commission in January, 1913, and was in their employ when he accepted the present position, February the first.

It will thus be seen that Mr. Brown has had considerable experience in road location, construction, and street paving.

First Work Undertaken by Organizer—Columbus County.

A visit was made by Mr. D. Tucker Brown and Dr. Joseph Hyde Pratt, State Geologist, to Whiteville, Columbus county, at the request of Dr. W. Ross Davis of Whiteville, who is leading a movement for a better system of highways in that county. They have secured an excellent superintendent of roads, Mr. J. W. Martin, who is very efficient with a convict gang and who is now using this force to good satisfaction for this county. Public meetings were held, addresses made, and because of these meetings it is believed that more interest will be aroused among the citizens of this county in the subject of good roads than has hitherto existed.

New Hanover County.

The next visit made by Mr. Brown was to New Hanover county, where much good work is being done in road building. It is the purpose of the county commissioners of this county to open up a new limestone quarry near Castle Hayne on the Atlantic Coast Line Railway. The present board of county commissioners are progressive and much credit in the establishment of the present system of road work is due to Mr. M. S. Willard, chairman of the board, Wilmington, North Carolina.

Mr. R. A. Burnett, superintendent of roads of the county, has inaugurated a system of maintenance of roads already constructed, which is leading to splendid results and could well be imitated by other counties of the state. The authorities are expecting to put some form of asphalt or top dressing on most of the roads leading out from Wilmington.

Warren County.

Warrenton township, which has recently voted a bond issue for good roads of \$50,000, has negotiated a sale of \$30,000 of road bonds and expects to begin work in the near future. The people of Norlina are very much disappointed over the defeat of the county bond issue of \$200,000, and hope to meet with success the next time such an issue is brought before the people.

Mr. D. Tucker Brown, Road Organizer and Engineer of the North Carolina Good Roads Association, has recently been in Warrenton township in consultation with the road commission in regard to the inauguration of a system of road construction for that township.

* * *

Foresters and Good Roads.

The annual convention of the North Carolina Forestry Association will be held in Asheville, April 8th and 9th. In connection with this convention a number of trips have been planned for the delegates to inspect various forest areas in western North Carolina. One trip will be made to Mt. Mitchell, and one of the features of interest will be the trail over the proposed Crest of the Blue Ridge Highway and this portion of this road already built.

There is a very intimate connection between Good Roads and Forestry, as the lumberman is especially interested in good roads from the standpoint of getting his products to the railroads.

* * *

Good Roads in Lee County.

It is stated that some of the lumbermen of Lee coun-

ty who operate sawmills near the end of the good roads, resort to the following expedient in bringing their lumber to market; that they haul as much as they can over the bad roads until they reach good roads, and throw it off. They then go after the second load. On their return to the beginning of the good road, they take on the first load, which has been thrown off, and haul it all with less effort than was necessary to haul half the load over the bad roads. In other words, a load can be hauled over good roads of more than twice the size of the load that can be hauled over a bad road and at less than one-fourth the expense, when the wear and tear on the horse and vehicle, the time of the driver, etc. are taken into consideration. What more need be said on the subject of good and bad roads!

* * *

Bad Roads in Chatham.

And yet, adjoining Lee county, with splendid natural resources in the way of timber, agricultural lands, etc., the people of Chatham county have failed to get in the line with such progress. It is a notorious fact that the link of the Quebec-Miami Highway which has to go through a neck of Chatham lying between Durham and Lee counties is the worst link of the whole stretch of this great International Highway, extending from Quebec, Canada, to Miami, Florida. It seems that this stretch of road is used as a lumber road, that those who use it drag logs along the road which, of course, makes the road worse all the time, and is harder on the team than if they had a good road and could haul the logs on a wagon. If this were a good stretch of road, there is but little doubt that the people travelling over this international highway, perhaps capitalists, would see the advantages of this county and would bring their money to help develop this section.

Even though the county of Chatham cares nothing for a great international highway traversing a portion of it, it should care for the terrible tax now being paid by the inhabitants of the county to bad roads. It is hoped that this county will get in line and before another year rolls around do what it can to build a county system of good roads, which will, without a doubt, be the means of developing the county so that its "five talents will be made ten" and not be kept in obscurity by bad roads.

* * *

Henderson county with a bond issue of \$100,000 is getting ready to do some good work. \$20,000 of this goes to the Fletcher Section in Hooper's Creek township; \$50,000 to Hendersonville township; and \$25,000 for hard surfacing purposes in various sections of the county. The county also uses convicts, which adds to the effectiveness of the road forces.

Sand-clay roads will be built in both Hooper's Creek and Hendersonville townships, and the township road trustees of Hendersonville have ordered a sand dredge to dredge Mud Creek. Major Theo. G. Parker donated all the sand necessary for road building purposes. The machine has been built to conform to the needs and conditions of Henderson county streams, and will have a capacity for keeping 75 wagons busy, as it will scoop the sand from the creek beds and dump it into the wagons.

* * *

A Road Institute to Be Held at Chapel Hill March 17th, 18th, and 19th.

A letter has recently been sent out by the State Geologist to road engineers and superintendents inviting them to attend a three days' institute at the state university, which will be conducted by professors in the

Southern Good Roads Is Made Official Organ of Southern National Highways Association.

The following letter, under date of February 10th, from the headquarters of the Southern National Highways Association, Clifton, Arizona, explains itself:

Hon. H. B. Varner,
Editor and General Manager,
Southern Good Roads,
Lexington, N. C.

Dear Sir:—

This is to notify you that Southern Good Roads has been designated as the Official Organ of the Southern National Highway Association.

This action was taken in consideration of the great good your Magazine is doing for the good roads movement, throughout the South and West. Wishing you continued success, and assuring you at all times full support.

Yours truly,
D. RODNEY ELLIS, DELL M. POTTER,
Secretary. President Southern National
Highways Association.

Engineering Department of the university, Dr. Joseph Hyde Pratt, State Geologist, and road engineers of wide experience and ability, with the idea of making this institute a clearing house for road problems met with by those who are in charge of road work in North Carolina. The chairman of the boards of county commissioners or of road commissions who have charge of the various counties and townships have been urged to see that their road engineers attend this institute, and are invited to attend themselves.

The principal subjects which will be taken up at this institute are:

- (1). Road Location and Design, including questions of locating the road properly as to grading, filling, width of road bed, shaping of road bed, drainage, etc., etc.
- (2). Road Surfacing, including sand-clay, topsoil, macadam, and bituminous macadam.
- (3). Drainage of Roads. Under this head will be taken up bridges and culverts of various kinds.
- (4). Road Machinery Supplies.
- (5). Road Surfacing Materials in North Carolina.
- (6). Discussion of Dirt Roads.
- (7). Maintenance of Roads.
- (8). Organization of Road Forces.
- (9). The Road Contractor.

There will be full and free discussions of the subjects undertaken, and on the evenings of the 17th and 18th there will be lectures illustrated by moving pictures: one relating to "Asphalt from its Source to the Pavement," and another on "The Use of Explosives in Road Construction."

It is expected that this will be the nucleus of a Good Roads Institute lasting a considerably longer time, and which will be the means of giving information useful not only to road engineers and superintendents but to road supervisors, foremen, etc., all over the state.

* * *

Material for 22 iron bridges for Polk county's new roads has arrived. The bridges will be constructed at an early date.

* * *

A year ago a bond issue was voted down in North and South Albemarle townships, Stanly county; but at

that time a Good Roads Commission was established. It is reported that some good work has been done in these townships under the jurisdiction of this commission, with what moneys they have. Mr. W. I. Mann has recently resigned from this commission, and Mr. J. M. Harris will fill his unexpired term.

* * *

It is expected that Edneyville township will very shortly vote on a \$17,000 bond issue.

* * *

Madison county has sold \$100,000 worth of her road bonds with a premium of \$1,450.

* * *

Bids have been opened for the construction of what is known as the Forsyth-Davie Iron Bridge. \$25,000 is to be expended in building the bridge.

* * *

Newport township of Carteret county will issue an additional \$5000 worth of good roads bonds. They wish to spend this on the Central Highway, which passes through that part of the county.

* * *

Kings Mountain Precinct of No. 4 township, Cleveland county, voted on February 17th, \$15,000 additional good roads bonds. Three years ago this same precinct voted \$25,000 in bonds; and, with \$5000 of this bond issue yet on hand, 16 miles of modern topsoil road finished, and with the additional bond issue, this will give about 30 miles of finished road.

* * *

The Asheville city officials and county commissioners of Buncombe county will get together to pave the road from the center of the city to Biltmore at a cost of about \$47,000. Of this amount the county commissioners are asked to contribute \$10,000 out of the county funds.

* * *

Mt. Airy township of Surry county, has sold \$60,000 of its bonds. This completes the sale of the entire \$80,000 bond issue, the first \$20,000 having been taken by local banks.

* * *

Sites have been selected for two new bridges in Watauga county across the Watauga and New Rivers.

* * *

The road commission of Orange county has finally decided upon the route for the Hillsboro-Chapel Hill road, which is to go via Cole's store and west of Blackwood Mountain. Contracts for the Cedar Grove and Efland roads have been let.

* * *

Meadows township of Stokes county has sold a \$40,000 bond issue. Engineer J. N. Ambler of Winston-Salem has been employed by the Road Commission to survey their roads. Dr. J. Walter Neal of Meadows is treasurer of the road commission.

* * *

Rutherford county has divided its bond issue up into smaller amounts, apportioning it according to the population of the various townships. This is about the best way they can take to get rid of their bond issue with results.

* * *

The county commissioners of Rockingham county have appropriated \$2,500 toward the construction of a bridge across Dan river in Ruffin township at the Virginia and North Carolina line.

NORTH CAROLINA GOOD ROADS ASSOCIATION PURPOSES.

Section 1. The purpose of this association is to act as the North Carolina division of the National Highways Association and shall exist:

To favor, foster, and further the establishment, development and maintenance of the national, state, county and township highways and "Good Roads Everywhere."

To secure the social, moral, commercial, industrial, material, educational and personal benefits in the uplift of the citizens of North Carolina, which follows in the train of easy and free intercommunication and transit between the great centers of population and the great productive areas of the state.

To disseminate knowledge and increase interest relative to the ethical and economic value of our public roads.

To aid all efforts for their improvement.

To advocate wise, equitable and practical legislation.

To urge the adoption of a comprehensive and efficient plan of administration that will improve, maintain and unify as one complete system the public thoroughfares of the country—to the end that we may secure:

A National Highway System,

A State Highway System,

A County Highway System,

A Township Highway System.

each a distinct unit, yet all integral factors of a complete system of "Good Roads Everywhere."

To insist that road officials faithfully perform the duties of their respective offices.

To secure integrity of expenditure and skill in construction and maintenance in all classes of road building and road improvement.

Chicago Chosen as 1914 A. R. B. A. Convention City.

At a meeting of the board of directors of the A. R. B. A., held at the Hotel Astor, New York, N. Y., on February 7, the question of the time and place for holding the annual convention and congress of the association was discussed. Upon the recommendation of the executive committee, it was decided to hold the 1914 convention in Chicago early next December. Owing to the great success of the Philadelphia convention in December last, at which there was a registered attendance of over 3,000, the largest cities in the United States and Canada, including Buffalo, Chicago, Atlanta, St. Louis, New Orleans, Milwaukee, Toronto and New York, had extended invitations. It was felt, however, that Chicago, more nearly than any other city in the United States, possessed the ideal facilities for accommodating the 1914 convention, because of its geographical location, railroads, and also the facilities for holding an exposition of machinery, materials and methods. The city of Chicago, it is certain, will do everything possible to make the meeting a success. It is understood also that every good roads organization in the country will be asked to co-operate in making the meeting a success.

According to the monthly bulletin of the Commercial Secretaries' Association, of Texas, bond issues were voted in Texas during January for \$1,200,000. Eight elections were held and three, involving \$360,000, in all, were lost.

Grayson county, Virginia, will let a contract for six miles of improved road.

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Edited by PROF. F. HORTON COLCOCK
University of South Carolina, Columbia, S. C.

SOUTHERN GOOD ROADS will devote this page exclusively to the interests of the South Carolina Good Roads Association. It will be open at all times to contributions from members of the Association in regard to Association affairs and road problems in the State. Send all contributions for this page to F. HORTON COLCOCK, University of South Carolina, Columbia, S. C.

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Federal Aid Advocates Must Agree on Plan.

(Continued from last month.)

And so I might continue to bring forward argument after argument along this line that would carry with them conviction to almost every mind, but alas! is this Utopia reasonable or possible?

If the government undertook to do this great work the first back-set it would meet with would be, the question that I thought dead, but to my surprise I find a living one, the question of state's rights or state control. Not that I, for one, would raise this question now, although myself an ardent democrat of the old school, for I earnestly believe that we should accept the decision made by the arbitrament of arms, and that we should try in every way possible to work under the new order of things, and lend our every effort to making a success of our government as it now is. I do not believe we should hand down to our children a tendency to sulk over a lost issue, and thus encourage them to make futile little fights, and raise futile issues and thus handicap them in their life's work.

But still it is a fact that this ghost of Banquo would arise and bring forth disputation and argument in almost every national convention and we should not be able to present the unbroken front of our whole people in our demands on congress. We must agree upon some plan or some measure, before success, that the whole people would support, nay demand.

If you think I am wrong about this you have only to turn to the last meeting of the National Conservation Congress. And I assure you if I judge by my own experience at great national gatherings this congress is not peculiar in that respect.

But where does this question come in? You could not expect this great government to undertake a work of such magnitude over which it may not have perfect control and power in condemning right of ways for the the purpose of maintenance. For of course the building by the government means maintenance by the government. If I know anything about the army corps of engineers there will be violent protest against their doing a great work and leaving it to go to destruction in the hands of the civilians especially the average incompetent who has charge of our roads.

Again, if the government built these roads in that way it would have to serve all the people alike and could they possibly do so? They could not and would not start these roads in spots all over the country. The engineers would have to carry one line or two at a

a time across the country from ocean to ocean or from lake to gulf, before starting others. While they were building these lines what do you think the people in other sections would be saying and, doing especially those sections that would not be reached in a hundred and fifty years? They would rise up and denounce a system that seemed to them partial to other sections. Suppose the government were to consent to an annual appropriation of twenty-five million that would mean at a maximum five thousand miles of roads per year, this would mean two lines of roads across the country. How long at this rate would it take to serve the whole people!

We do not want long continuous lines competing with railroads, we do not want to establish transcontinental traffic by road. The railroads and the rivers are here for that purpose and long continuous hauls will always be turned over to these carriers and should be. What we want is to make the hamlet and the country communities accessible to the great distributing points. What we want is to bring rural life into a close community with each other and the world as possible. These long lines would be beneficial especially to the touring wealthy. It would be very charming to get in an automobile in the city of Richmond and have a magnificent macadam road kept up by the United States government by which one could travel all the way to Los Angeles, but that road would have very little effect in solving the difficulty of the dweller of the valleys of Virginia. And so at once it would be apparent to the public that the comfort and pleasure of the wealthy would be subserved while very little benefit accrued to the masses of the people.

There are many more reasons that I could assign to show the fallacy of this proposition. As beautiful as it is in theory it falls far short of being even an approximation of a solution of our road question. Lack of space prevents me from going more fully into the subject. But one conclusive reason alone the impracticability of the proposition in my opinion is sufficient, to defeat it. Then let us get together on some proposition upon which all of us will agree and work on congress for the money to be expended in the most judicious way.

* * *

The Mullins Enterprise says: It will be interesting news to our readers interested in good roads to know that there will soon be opened to Florence a good highway on a direct line, thus shortening the distance by half. As it is now, people wanting to go to Flor-

ence, Sumter, Columbia and other points west, are compelled to go around by Cheraw in order to cross the river.

* * *

After a brief period of debate the South Carolina house of representatives on Thursday night, February 12th, killed the Liles bill which provided for a state highway department under the supervision of the commissioner of agriculture and providing for a license fee for automobiles to maintain the department engineers and build good roads.

The following brief account of the debate on the bill is taken from the Columbia State:

Mr. Liles of Orangeburg said that his bill filled all the requirements for obtaining the \$416,000 offered to South Carolina by the federal government for road improvement. He said that by putting the operation of the road improvement bill in the hands of the department of agriculture, instead of creating a new department, the state could expect immediate results. Mr. Liles said that 38 states already charged automobilists for the privilege of using their roads. His bill plans an annual license fee of \$5 on all automobiles.

"No owner of a motor car will object to paying this fee," said Mr. Liles, "because good roads will save him many times this amount annually in repair bills."

Mr. Liles contended that there was no need to create a new department to get supervision of the state highways when the department of agriculture had sufficient machinery to put the measure into effect at once.

Many members questioned Mr. Liles about various features of his bill. Mr. Liles gave Commissioner Watson credit for drawing the measure.

Mr. Epps of Sumter said that he was opposed to the Liles bill because the commissioner of agriculture already had all the work he could do without the imposition of the duties of state highway commissioner.

Mr. Belser spoke in favor of the bill with his amendment providing that the professors of civil engineering at the three state colleges should act as members of a state highway commission.

Mr. Moore of Abbeville said he was opposed to the bill and believed that the collection of automobile taxes should be a matter for each county.

Mr. Barnwell of Charleston said that he believed it essential that each county should have the supervision of the construction of its own roads if it were to have good ones. He advocated a state highway commission with Commissioner Watson as chairman, the heads of the civil engineering departments of the three state colleges and one other man to be named by the governor as members, who were to receive no salary but were to advise the county supervisors on road building when they were asked to do so.

Mr. Barnwell said that it was only fair that automobilists should pay a license, one-third of which would be expended under the direction of the highway commission and the rest to be divided proportionately between the counties.

Mr. Boyd of Spartanburg ridiculed the idea that a state highway engineer could supervise road construction all over the state. He claimed that under the Liles bill one-third of the fund from the license from automobiles would be unproductive.

"If you want good roads, elect a supervisor who knows how to build them, as Spartanburg has done," said Mr. Boyd.

He declared that the only thing about the whole matter was that by passing a bill creating a state highway commission the state might be able to tap Uncle Sam's purse.

DRAG THE ROADS.

Dedicated to the King Road Drag

When the summer sun is high,
Drag the Roads.

When the crops are all laid by,
Drag the Roads.

In the fall and in the spring,
When the birds begin to sing,
Mind you! It's the very thing—
Drag the Roads.

When there's heavy loads to haul,
Drag the Roads.

When you go to make a call,
Drag the Roads.

Often on the way to town,
Should the grade be up or down,
Never falter! Never frown!
Drag the Roads.

When the farm work crowds apace,
Drag the Roads.

When you find a resting place,
Drag the Roads.

After all the heavy rains,
You can count up many gains,
If you'll only take the pains,
To Drag the Roads.

If your wife or daughter scolds,
Drag the Roads.

Fill up all the ugly holes,
Drag the Roads.

It will keep your temper sweet,
Drag the Roads.

Horses sleek, and wagon neat,
Make a track that can't be beat,
Drag the Roads.

Whether soil be sand or clay,
Drag the Roads.

You can find no better way,
Drag the Roads.

When too wet to run the plow,
Run the drag and then see how
Passers by will smile and bow—
Drag the Roads.

Get your neighbors on the job,
And drag the roads;

Some will fuss and some raise hob,
But drag the roads.

What if you do pay your tax
And you find that things are lax,
Settle down to solid facts,
And drag the roads.

—L Dillon, Bedford City, Va.

Motorcycles—12 pairs of them—hitched to 12 large wagons, were one of the leading features of the Good Roads Day program in East St. Louis, Ill., recently. A number of members of the East Side Motorcycle Club offered to help in the big road-making campaign and also suggested that a great deal more could be accomplished if the wagons carrying material for the work were drawn by motorcycles instead of mules. Mayor Chamberlin accepted the offer of these riders, and all day long the two-wheelers, two abreast pulled the heavy wagons up and down the highway, delivering material to the volunteer road makers.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Kentucky.

The county road engineers of Kentucky met in Frankfort on February 4. They were welcomed by Mayor Joseph Rupert, in a very happy address to which Mr. J. R. Gaines, of Louisville, president of the organization, responded. Attorney General James Garrett spoke on legislation needed for good roads in Kentucky and Hon. J. W. Newman, commissioner of agriculture, made an address on good roads from the view-point of the farmer.

The entertainment of the convention was featured by a smoker and informal reception, which was attended by the committees on public roads from both the house and the senate, the Kentucky legislature being in session. At this gathering there were a number of informal speeches on topics of interest to the roadbuilders, led by Senator J. F. Bosworth, one of Kentucky's best known good roads men, chairman of the senate committee, and Representative John McDyer, chairman of the house committee. Some features of the program were as follows:

"Earth Road Construction and Maintenance," B. J. Calloway, Lawrence county; "The Relation of Good Roads to Educational Progress," Barksdale Hamlett, Superintendent Public Instruction; "The Kentucky Good Roads Situation," Joseph M. Kendall; "Sand-Clay Roads," D. P. Winslow, Washington, D. C., United States Highway Engineer; "The Care and Use of Road Machinery," C. S. Woodward, Jessamine county; "Co-operation Among Highway Officials," R. C. Terrell; "The Construction, Care and Repair of Macadam Roads," Guthrie Wilson, Nelson county; "Construction and Repair of Gravel Roads," J. R. Thompson, McCracken county; "Economical Side of Roads and Road Building," D. P. Winslow, United States Highway Engineer, Washington, D. C.; "Importance and Methods of Drainage," Will P. Caldwell, Boyle county; "Contract Letting and Design of Highway Bridges," W. E. Rowe, dean College of Civil Engineering, State University, Lexington, Ky.; "Obtaining Efficiency in County Organizations," W. B. Paynter, Anderson county.

* * *

Louisiana.

Returning to New Orleans from an inspection trip in Calwell and Madison Parishes, W. E. Atkinson, chief engineer of the highway division of the State Board of Engineers, stated to a representative of the New Orleans Picayune that he found work progressing well on a number of contracts. There are several excellent roadways being constructed. Mr. Atkinson states that the people with whom he came in contact expressed sentiments in favor of substantial roadways, and the property owners are very much more willing now to be taxed than they were some years ago for these public improvements.

Mr. Atkinson received a report from Engineer C. N. Kerr to the effect that he had surveyed the roadways to be constructed in and about Hammond. Mr. Kerr says there will be seventeen miles of roadways radiating out of Hammond, north, east, south and west, and that bonds aggregating \$75,000 have been voted to pay for these improvements. Both Mr. Atkinson and Mr. Kerr pointed out that these gravel roadways will be

of incalculable benefit to the people in the vicinity of Hammond on account of the immense strawberry crops and various other industries in the parish.

* * *

Maryland.

Chairman O. E. Weller, of the Maryland State Roads Commission, appeared before the house ways and means committee recently to explain the need for an additional appropriation of \$6,000,000 to continue the work of building state roads for the next two years.

Mr. Weller's exposition of the report recently submitted by the commission was very clear and at the end he was asked many questions by Chairman Lloyd Wilkinson and a few other members of the committee. He had much information and many figures not contained in the preliminary report and these gave the committee a clear view of the state road work that has been done, and what is projected for the next two years.

The progress that has been made in the completion of the system and what is needed to fill in the gaps was explained by means of a large map which was hung on the wall of the committee room.

Delegate Wilkinson asked whether the chairman favored the use of convict labor on the roads, and Mr. Weller replied that he did.

He thought that the use of convict labor in this state would bring about a material saving.

Mr. Weller was accompanied by Chief Engineer Shirley, Commissioner Goslin, Assistant Chairman Zouck and Council Leon E. Greenbaum.

* * *

Mississippi.

The board of supervisors of Warren county has engaged as road construction engineer W. P. Moore, who will at once prepare plans and specifications for 15 miles of country road to be built as a test or example.

The board will arrange later for further work to be paid for out of the proceeds of the \$300,000 bond issue.

It is not decided where the sample 15 miles of road will be laid off but it will be settled at an early meeting, so that work may begin at once.

Engineer Moore's compensation will be 4 per cent of the gross expenditure. He gives bond in the sum of \$2,500.

* * *

Missouri.

The state of Missouri is interested in a bill which Congressman Henry A. Barnhart of Rochester, Indiana, has introduced in congress for continuing the Cumberland road through the states of Ohio, Indiana, Illinois and Missouri.

When these states were admitted to the Union, the general government gave its written pledge that 1-20th of the net proceeds from the sale of all public lands situated within these states would be applied by congress to the building of a national road from tide water on the Atlantic coast to and through these states.

Subsequently, the government sold the public lands thus reserved and pledged to the purpose of building roads, and appropriated the available proceeds to the

building of a road known as the Cumberland road in the states of Maryland, Pennsylvania and Virginia. Only a small part of the money was spent in any of the "public land" states, and none of it reached Missouri.

Congressman Barnhart's bill calls for an appropriation of \$5,000,000 for continuing the construction and providing for the maintenance of the Cumberland road in those states. Ohio, Indiana and Illinois are each to get \$1,000,000 and Missouri \$2,000,000. The bill authorizes the president of the United States to appoint three national highway commissioners to have full charge of the construction, repairs, and maintenance of the road. They are to serve three years and receive \$5,000 a year each for their services.

The road follows the route of the National Old Trails road and is a part of the system of 50,000 miles of national highways proposed by the National Highway Association. The Cumberland road does not touch Mr. Barnhart's district, but he recognizes as Lincoln did that "no public improvement is so local as to be of no general benefit." The rebuilding and re-nationalization of this road will not only benefit Ohio, Indiana, Illinois, and Missouri, but it will benefit every state in the union.

* * *

Florida.

In order that the good roads movement in Florida may be given new life and a larger number of people become interested in the work, a movement has been started to consolidate the State Chamber of Commerce and the State Good Roads Association. The Jacksonville Metropolis states that practically all of the members of the two organizations in Jacksonville are in favor of the plan.

The annual meeting of the State Good Roads Association was to have been held in Gainesville on February 24 and 25, but the dates were cancelled and no new ones named. The plan is to have the officers of the state chamber of commerce meet with the good roads people and discuss consolidation when the next session is held.

J. O. Stevens, of St. Augustine, secretary of the state chamber of commerce, is heartily in favor of such a plan. He talked the matter over with good roads people of Jacksonville recently and urged that something be done along such lines.

The advantage to be gained by such a move would be to have all of the good roads people in one big organization. It was suggested that if the plan could be worked out, the first steps to be taken by the new association would be to start a campaign to have the voters of the state pledge themselves to no candidates for the legislature save those who are for good roads.

The state chamber of commerce was organized a little over one year ago and the good roads association is about five years old.

* * *

Tennessee.

Governor Ben Hooper's state highway commission, composed of 30 of the leading good roads advocates of the state, met in Nashville early last month and laid plans for its work. Mr. R. A. Wilkes, of Culleoka, a prominent member of the commission, who attended the meeting, has issued the following statement in regard to it:

"Heretofore there have been spasmodic efforts at various times in certain counties of this state to build better roads. There has, however, been no concerted, systematic effort to define and follow any fixed policy in the construction of public roads. At the meeting of the highway commission, one man was appointed to

write the superintendent of roads in each state in the union and get the plan under which that state conducts and builds its roads, and the laws that have been enacted to promote them. When all this data has been collected and arranged in a systematic way, the committee from this state will meet and carefully go through it to select and appropriate for its own use that which seems best and most available for use in Tennessee.

"The commission is to be entirely free and devoid of all politics. In the assembly, which was made up of gentlemen from every section of the state, there were men of every shade of political faith and belief, and all were unanimous in the expression of the opinion that politics should be absolutely debarred from the deliberations of the meeting of the committee. They took the position that good roads were not a political subject, and pledged their efforts to debar them from all political wrangles. They went further and stated that they would use their best efforts to have inserted in the platforms of their respective parties a plank upon the subject of good roads. Heretofore the subject has been subordinated to many other things that were much less important and it has not gained the attention and consideration that its merits deserve. It would have gained more had it not been for the political turmoil and confusion that has prevailed in the state for the past few years.

"When the commission has sifted all the suggestions of the various states, then the most available will be chosen and framed in a law that will be presented to the next legislature for passage. There will be absolutely no favoritism and politics in it. It will be designed with the purpose of providing a fixed highway commission that will with the aid of an able road engineer, pursue an advanced, progressive course in the betterment and construction of the public roads of the state. I believe that it will be the greatest forward step that will be taken in years, for it will inaugurate a systematic, fixed policy that will be of incomparable benefit to the great mass of the people.

"So great was the interest and the enthusiasm manifested that several bankers in the assembly wanted to raise \$10,000 to advertise and spread abroad literature and information upon the subject. However, nothing definite was done along this line. I believe that with the proper presentation of the subject to the newspapers of the state, they will lend us ungrudgingly their columns and their aid in the advertisement of this great matter."

* * *

Texas.

Governor Colquitt has designated the road between San Antonio and Austin for improvement under the cooperative project authorized by congress last year and the governor has been advised that an engineer from the U. S. Office of Public Roads will be sent to make the necessary surveys. The letter containing this information said:

"It is scarcely feasible, at this time to give any definite assurances that we will be able to increase our allotment of \$30,000, but the matter will be borne in mind and, if possible, the action you suggest will be taken at a later date, this statement being contingent, of course, on the favorable report of the engineer."

Governor Colquitt made the request that the allotment be increased from \$30,000 to \$40,000. The plan is to have Travis, Hays, Comal and Bexar counties to appropriate \$20,000 each to the project, which with \$40,000 from the government will make \$120,000 available for improving the San Antonio-Austin highway

and make it the best piece of public road in the southwest.

* * *

West Virginia.

That the state road bureau is making an earnest and systematic effort to put West Virginia on the good roads map is shown by the plans now being formulated under the direction of Chief Engineer Williams. The general plan, as outlined by the *Wheeling News*, is to improve the old turnpikes of the state and connecting roads so that all the county seats of the state will be connected by a network of first class highways.

The plan is an ambitious one but it is far from visionary. The bureau has been promised the active co-operation of a majority of the boards of trade of the state, the state automobile association and numerous other organizations which are interested in better roads. It is understood that formal presentation of the plan will be made at the next session of the legislature, and, considering the sentiment throughout West Virginia, hearty support is practically assured.

Counties will be asked to co-operate and it is thought that a majority will cheerfully render substantial assistance. At many points, the expenditure required will be comparatively small. West Virginia has quite a number of splendid roads but they are isolated. With the projected connections made, West Virginia would take the place she deserves as a state of good highways.

Officers of American Road Builders Association Elected.

The annual meeting of the American Road Builders' Association for the election of officers was held at the Hotel Astor, New York, N. Y., February 6. At this meeting the following officers and directors were elected:

President, W. A. McLean, Commissioner, Department of Public Works, Toronto, Ontario, Canada.

First Vice President, Geo. W. Tillson, Consulting Engineer, Borough of Brooklyn, N. Y.

Second Vice President, A. W. Dean, Chief Engineer, Massachusetts Highway Commission, Boston, Mass.

Third Vice President, A. B. Fletcher, Highway Engineer, California Highway Commission, Sacramento, Cal.

Secretary, E. L. Powers, Editor "Good Roads," New York, N. Y.

Treasurer, W. W. Crosby, Consulting Engineer, Baltimore, Md.

DIRECTORS FOR THREE YEARS:

Samuel Hill, President, Washington State Roads Association, Seattle, Wash.

Paul D. Sargent, Chief Engineer, State Highway Commission of Maine, Augusta, Me.

A. H. Blanchard, Professor of Highway Engineering, Columbia University, New York, N. Y.

R. H. Gillespie, Chief Engineer of Highways, Borough of the Bronx, New York, N. Y.

Harold Parker, Ex-Chairman, Massachusetts Highway Commission, Worcester, Mass.

Fred E. Ellis, Manager, Essex Trap Rock & Construction Co., Peabody, Mass.

The reports of the executive committee, the secretary and the treasurer were presented. These reports showed a large gain in the active membership of the association, while the financial condition was found to be very satisfactory. Altogether the work of the association during the past year has been the most gratifying in the history of the organization.

Status of the Federal Aid Good Roads Bill.

In the current issue of the *American Motorist* the status of the federal aid good roads bill is briefly reviewed as follows:

After passing the House of Representatives by a vote of 284 for, with 42 against, 5 answering present, and 101 not voting, the compromise measure of the Committee on Roads has been introduced in the Senate and referred to the Committee on Post Offices and Post Roads.

This committee consists of the following: J. H. Bankhead, Alabama, chairman; E. du R. Smith, South Carolina; Claude A. Swanson, Virginia; Nathan P. Bryan, Florida; James E. Martine, New Jersey; Hoke Smith, Georgia; Luke Lea, Tennessee; William E. Chilton, West Virginia; J. K. Vardaman, Mississippi; Boies Penrose, Pennsylvania; William O. Bradley, Kentucky; Joseph L. Bristow, Kansas; Charles E. Townsend, Michigan; Thomas B. Catron, New Mexico; LeBaron B. Colt, Rhode Island; John W. Weeks, Massachusetts.

The measure was subsequently passed to a sub-committee of five, made up of Senators Bankhead, Hoke Smith, Penrose, Bradley and Swanson.

Quite skillfully drawn is the good roads measure in that section 3 appeals to many members of Congress who would oppose the procedure in their home states under section 4. Under section 3 a state can use its share of the \$25,000,000 appropriated yearly in the construction and maintenance of whatever roads may be determined upon by its highway department in co-operation with the Secretary of Agriculture. Of course the state itself contributes a like amount to what is received.

Under section four there reappears the original Shackleford roads rental plan for R. F. D. routes, with the roads divided into classes A, B, and C—\$60, \$30, and \$15 per year per mile. Whatever mileage of roads a State may have in these three classes it at once would receive rental money for. No appropriation whatever is made for construction except as the State might advance a dirt road from class C to class B, or a gravel road from class B to class A, which calls for a hard road of any one of several materials.

Exactly what will take place in the Senate it is rather

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er difficult to predict at this time. It is not improbable that the measure will be the subject of considerable debate, and if it should receive approval, it is surmised that there will be several rather far reaching amendments.

"GOOD ROADS DAY" IN LYNCHBURG, VA.

Tuesday, March 24, will be "Good Roads Day" in Lynchburg, Va., and the Chamber of Commerce is perfecting plans to hold a big good roads meeting there on that day. The meeting will consist of three sessions, one each in the morning, afternoon and night. They will be held in the auditorium of the Y. M. C. A.

The event will be participated in by officials of the good roads division of the United States Department of Agriculture at Washington, by the engineers of the State Highway commission, county supervisors and county highway commissioners, the officials connected with the immigration departments of the railroads, officers and road committees of different commercial organizations in the State interested in State highway building, automobile clubs, farmers and business men.

A special feature of "Good Roads Day" will be an address delivered by Mr. M. O. Eldridge, a road expert from the office of public roads in the Agricultural Department at Washington. In connection with his address will be given a series of most interesting illustrations which will show various phases of the process of building roads, the right way to do it and the wrong way.

Some of the strongest speakers possible to secure will be present at the meeting, offering the best there is to be had on this important subject. Mr. P. G. Coleman, State Highway Commissioner, and his assistant, Mr. C. B. Scott, are very much interested in the plan and will occupy a part of the time of the program. Messrs. Henry Roberts, of Bristol; W. B. Hubbard, John T. McKinney, E. W. Hicks, O. L. Evans, and others will participate in the meeting.

The details of the meeting are not yet entirely worked out and the program will not be ready for some days to come.

Road Superintendents May Ride With Mail.

Hereafter road commissioners will be accorded the privilege of riding with rural carriers in the inspection of roads. The new rule was announced in the January supplement to the Postal Guide and is as follows:

Postmasters at rural delivery offices are instructed to permit road supervisors or commissioners having direct charge of the highways over which rural delivery routes are in operation to ride over the routes with rural carriers when such road officials are actually engaged in the performance of their duties in connection with the inspection of the roads.

The new rule will be a great advantage especially to county superintendents of roads who will be enabled to inspect an average of 25 miles of roads daily without going to the expense of horse or auto hire.

Rhea county, Tennessee, votes on March 31st on the question of issuing \$300,000 of bonds for road building.

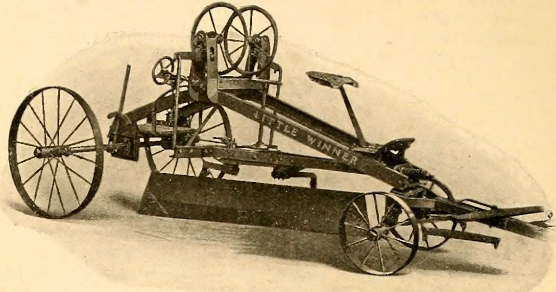
Floyd magisterial district, Scott county, Virginia, votes April 21 on a bond issue of \$442,000 for roads.

Miami, Florida, will vote next month on a bond issue of \$60,000 for streets.

HERE ARE THREE ROAD MAKING MACHINES

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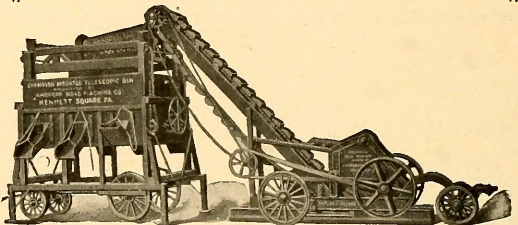
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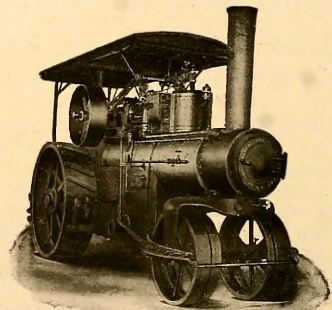
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Highway Commission For Texas

By J. W. WARREN

President Texas Good Roads Association, San Antonio, Texas

COMPLYING with the request of the editor of Southern Good Roads for a statement from me in regard to my views and the needs of Texas, as I see it, for a Highway Commission and the adoption by our legislature of a plan for working convicts on the public roads, I will say that both of these have been hobbies of mine for sometime past. At the recent annual meeting of the Texas Good Roads Association, held at Fort Worth, a resolution was adopted unanimously, from which I quote the following language:

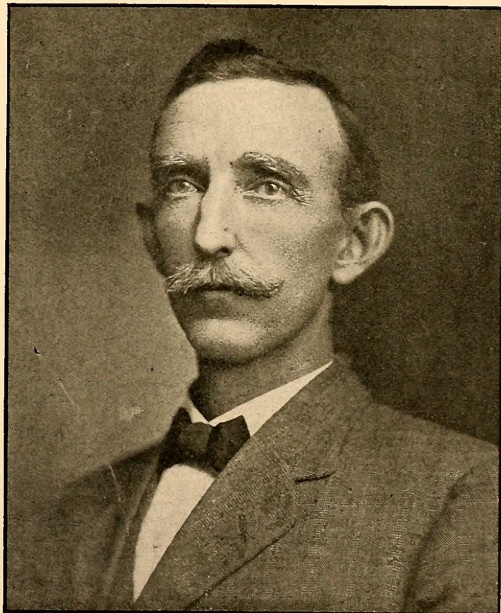
"That this association considers the establishment of an adequate State Highway Department, to be the paramount issue now confronting the good roads advocates of Texas, and that we do hereby most urgently petition the thirty-fourth legislature of Texas to establish a highway department, headed by a State Highway Commission and a State Highway Engineer, and that such department be provided for on such liberal scale as will at once insure its taking rank with the most dignified and important of our state departments."

As the readers of this magazine are probably aware, the good roads movement in Texas has grown rapidly and wonderfully in the past few years. Counties and Precincts and Road Districts are voting bonds for permanent improvement of their highways. During 1913 more than \$3,000,000 in bond issues were voted in this state by local districts and counties. Since January 1st, 1914, to date nearly \$3,000,000 have already been voted. But, regardless of these vast sums of money being expended, there is and can be no system to our road construction until we have a State Department. It seems to me that our legislators have overlooked one of the most vital economic questions confronting Texas today, and have devoted more time to other questions not half so important as this one.

With a highway department, a competent engineer in command and competent engineers in its employ, a little road district, or precinct, contemplating the improvement of its highways, could appeal to this department for an engineer to come into its territory, look into its materials carefully and inspect and test these, give estimates on cost per mile of different characters of construction, with the best material available, and such district or precinct could then get at the question more intelligently and more advishly as to how much money they would need, how many miles of road they could build, and after the bond issue was voted, could still appeal for aid to this department, for engineers to come down and assist them in making plans and specifications, to advise with them on drainage and loca-

tion, grades, etc., thus wonderfully safeguarding the expenditure of these vast sums which are now being voted for road construction in this state.

I shall not attempt to portray the vast opportunities or the good that could be accomplished by systematizing state aid in this way to road construction. Most of the states in the union have already adopted



MR. JOHN W. WARREN,
President of the Texas Good Roads Association.

some plan of commission or highway department, and being a native Long Horn I dislike to see Texas behind in any particular.

P. D. Armour once said that no great manufacturing corporation could prosper until it utilized its by-products. I believe the same to be true of society. One of our by-products is the convict and our utilization of

him in the construction of highways is strictly along efficiency lines. From a recent report on convict labor, from the state of Washington, I quote the following paragraph:

"A result is now that we not only are road building excellently but that we are man building with a success which almost startles even those of us who from the beginning have had most hope for the experiment's success. While the convicts make the roads, the roads make men."

In an article in *Popular Mechanics* recently some statistics were given in regard to the number of convicts in the United States. It was estimated that 150,000 men annually are added to the prison rolls. Suppose that only 100,000 of these, for various reasons, could be worked on our public roads, it would mean 30,000,000 days' work a year. Think of the wasted energy of this vast army of practically unemployed, or at best, employed so as to be a cost and a burden to the state, instead of yielding any lasting good or results or benefits to the state or community against which they have sinned.

When Warden Tynan took charge of the state prison in Colorado several years ago he found a hapless crew of 500 idle creatures, many of them practically on the verge of melancholia. Today the prison of Colorado is the center of a wonderful system of scenic roads built by the convicts, (the delight of the tourist and among the chief assets of that state), and they have all been built by cheerful, healthy convicts working, generally, without guard or restraint, many of them miles away from prison walls. Illinois, Michigan, Minnesota, Washington, Utah, Colorado, Wyoming, Virginia, Arizona and several other states have utilized the convict on the public road, and almost without exception, satisfactory results have followed. The men have appreciated living in the open air, their health and morals have improved, their work has been of benefit to their state and very little trouble has been given.

For several years our association has endeavored to create a sentiment in this state to have convicts employed on our public roads, where the sunshine and pure air would build up the physical man and give that rugged health which would enable the unfortunate, upon his release, to have a clear head and strong body instead of being the pallid wreck, which so often leaves the prison, nerveless, spineless and unfit to undertake the task of reclaiming his place as a useful member of society.

Our convict system in this state is a considerable expense. I have been reliably informed that our convicts have cost us more than \$800,000 in the past two years. In Colorado with convict labor, Mr. Tynan states, he is constructing high-class, permanent roads at one-fourth to one-third of the cost of construction under a contract system with free labor. Other states in the union, that have adopted systems, make similar reports, but we cannot hope for any intelligent, comprehensive plan for utilizing our convict labor to the best advantage, without a highway department, and a system. No business of any magnitude can be run without system.

On February 10th last the Shackelford Good Roads bill passed the House of Representatives at Washington by a large vote, 284 for and 42 against. There are several other good roads bills before congress. All of which indicates that federal aid in some shape is coming. But not to come to a state that has no highway department. Our own legislators and congress are recognizing that there is something else in this country besides cities, sea coasts and navigable streams, and we road enthusiasts are now beginning to wonder how states that have been lagging behind and not providing

for a State Highway Department, can get the benefit contemplated by the Shackelford bill and others, or federal aid in whatever shape it may finally pass congress. This point, however, of federal aid is a minor one as compared with the other two, above mentioned. I have never seen a corporation successful without organization and this big proposition of systematic road construction, which is one of the most vital of the economic questions confronting us today, it seems to me should be recognized by our law makers and provided for on a scale commensurate with its magnitude and importance.

A Texas Highway Guide and Log Book.

The Houston Post reports that Mr. A. L. Ulrich, representing the Bexar County Highway League and the logging department of the Texas Good Roads Association, is engaged in gathering data in the Houston district and elsewhere.

The league is about to publish a comprehensive log-book and highway guide of the state similar to the bluebooks published by northern associations. The book will contain information desired by automobilists compiled under 14 sections, of which 14 cities are the geographical and commercial centers.

The work of gathering the information required to compile this book has extended over nearly three years, and the maps, descriptive matter and other data secured is valued at over \$15,000. A number of logging crews under the direction of D. E. Colp of San Antonio, the active head of the league, have been at work for two years and the league has co-operated with Colonel Westgard, official logger of the Lincoln Memorial Highway, in logging routes from Oklahoma City to Laredo and has logged a road to be incorporated in this highway from Laredo to Brownsville.

The past two months has been devoted to logging a military highway from Brownsville to El Paso and the league is hopeful that the government will furnish its share of the money to construct this road. The league has also done much toward having a military highway from San Antonio to Austin established by the government so that troops from Fort Sam Houston can participate in maneuvers with the state militia at Camp Mabry.

During the past year the league has been instrumental in securing the passage of road bonds amounting to over \$7,000,000 in southwest Texas and has aided in getting bonds in McLennan and Tarrant counties.

The Houston district comprises the counties of Harris, Galveston, Jefferson and the intervening counties.

Hon. Edward E. Goslin Dead.

Hon. Edward E. Goslin, the only democratic member of the Maryland State Highway Commission, died at his home at Federalsburg, Md., March 20, after an illness lasting three days.

Mr. Goslin was one of the foremost good roads men of his state. He served terms in both the state house of representatives and the senate. He was instrumental in passing Maryland's model state aid law and other progressive road legislation and he became secretary of the State Highway Commission, holding that position until the commission was re-organized under Governor Goldsborough, when he became a member of the commission.

He was active in good roads work up to the time of his death and only a few days before his death he was at Annapolis conferring with members of the legislature in regard to good roads legislation.

Work of the Texas A. & M. College For Better Highways

By **ROBERT J. POTTS**

Professor of Highway Engineering, Texas A. & M. College, College Station, Texas

ACTUATED by a keen appreciation of the increasing importance of good roads to the state, and by the desire to bring the College into closer touch with the people, and make it a more direct benefit to the state, the Board of Directors of the Agricultural and Mechanical College of Texas, at their meeting of April 1, 1910, established the Chair of Highway Engineering as a sub-division of the Department of Civil Engineering in this College. The duties of the incumbent of this position were defined as follows:

1. "He shall receive instructions from, and work in harmony with, the professor in charge of the Civil Engineering Department in all matters pertaining to the

with the instruction work in the Department of Civil Engineering.

3. "He shall have, under the direction of the head of the department, immediate charge of the instruction in highways and pavements, and in addition shall teach such other subjects in the civil engineering course as his available time may permit.

4. "Upon request of county commissioners, officials of good roads organizations, town councils, and other organizations directly interested in good roads, he shall give advice as to the best methods of location, construction, and maintenance of principal thoroughfares between the larger towns, and furnish general approximate estimates of cost, but in no case shall he be required to make detailed surveys, estimates or designs."

In addition to the instruction work offered within the Department of Civil Engineering, this division will endeavor to conduct outside work with two main purposes in view:

1. To collect, tabulate, and distribute authentic information on road work as it is actually being done in Texas, and so far as possible, in other states as well.

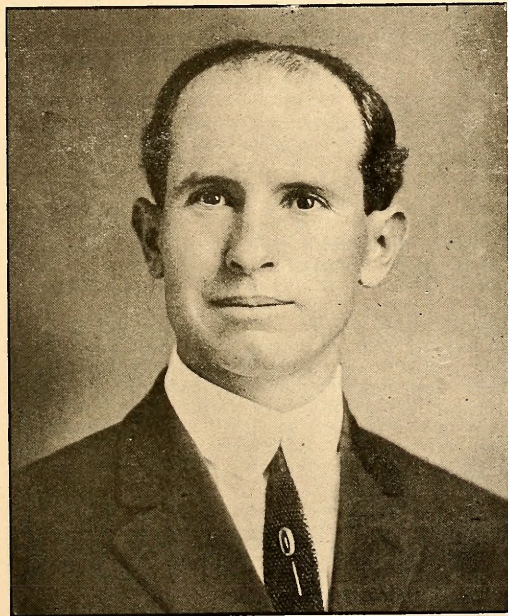
2. To give special information and assistance to those directly engaged in road building. This may take the form of general advice as to the location, width, grade, materials, and equipment to be used in any case. But this department will at no time enter into the details of these matters as would be expected of an engineer directly in charge of such work.

Owing to the meager finances of the college, the funds available for this work will necessarily be limited. Therefore, we earnestly request all engineers, contractors, public officials, and officers of good roads clubs to assist us in every way possible. Invaluable service can be rendered to the college and to the state at large, by preserving and transmitting to this department accurate information as to the methods, materials, cost, and results of road work done under the varied conditions existing in the state. Information as to the methods of financing the work will be especially appreciated, as will also be the case with work projected, or contemplated, in the near future.

When called upon, we will be glad to render any direct assistance possible with our limited means. And in return we bespeak the hearty co-operation of all who are interested in the great work of bettering the thoroughfares of Texas.

In addition to lectures, publications, inspections and other engineering assistance, the College has prepared a set of road models, similar to those of the United States office of public roads, together with other materials suitable for exhibit. This exhibit has been shown on trains and at many at the leading fairs and other public gatherings during the past four years.

The College has purchased and is now installing standard machinery for testing road rock for toughness, hardness and resistance to wear. The laboratory is already equipped to make examinations of gravel for road building purposes. We hope, also, in the near future, to be able to provide a complete equipment for



ROBERT J. POTTS

Professor of Highway Engineering, Texas Agricultural & Mechanical College

department; and with reference to his outside work may have occasion for frequent conferences with the president of the college, to whom he shall be responsible, through the head of the department, for the conduct of his outside work.

2. "In addition to his teaching work, it shall be his duty by correspondence, public lectures, published articles, conferences with interested officials, etc., to arouse interest in the construction of improved highways in this state, and to assist in any movement towards this end. His absence from college, shall, however, be so timed as to interfere as little as possible

the testing of asphalts and oils intended for road and pavement work.

An agreement has been perfected between Hon. E. B. Cushing, President of the Board of Directors of the A. & M. College and Mr. John W. Warren, president of the Texas Good Roads Association, by which the college will co-operate in the general work of the associa-

tion by furnishing engineering advice on request of that organization. The College will furnish the men and the association will pay the traveling expenses. It is believed that this arrangement can be made of great value to the various counties, both in reference to the location and construction of the roads, and also in the testing of materials.

The Organization and Work of Texas Good Roads Association

By HOMER D. WADE

Secretary-Treasurer Texas Good Roads Association, Stamford, Texas

SEVERAL efforts were required, before the movement to put the Texas Good Roads Association on a permanent basis was successful. Perhaps the first was made at Waco in 1905, when a meeting was held and an organization formed. This lasted for a year or so and passed away. Later the good roads enthusiasts

and Mechanical College had taken steps to enlarge the instruction in highway engineering, and to provide assistance to the good roads movement in the state. Under its leadership and direction a Good Roads Day was observed at the State Fair at Dallas. The meeting was attended and participated in by representative men from all parts of the state. A committee on organization was selected that day and instructed to report a plan of organization to a similar meeting one year later. This was done and in 1911, the Texas Good Roads Association was permanently organized.

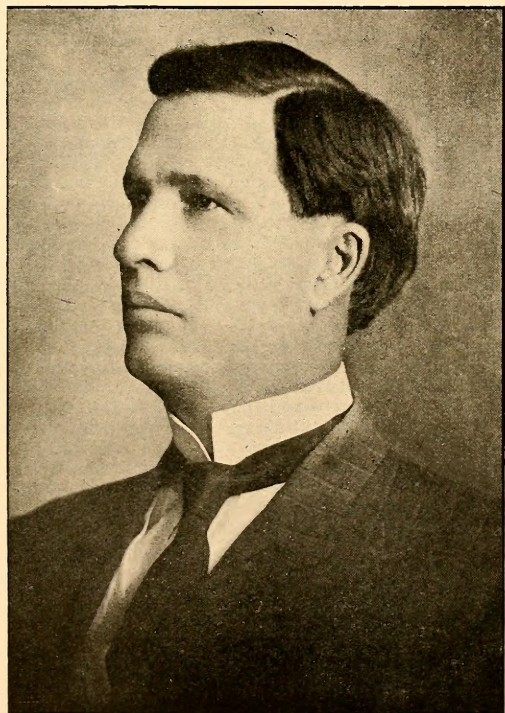
That great apostle of good roads, Judge O. E. Dunlap of Waxahachie was made president of the organization, G. W. Baker, of Dallas, secretary, and R. J. Potts, of College Station, engineer and these men were backed by such well known good roads enthusiasts as Senator H. B. Terrell of West, W. W. Seley of Waco, Col. E. W. Kirkpatrick of McKinney, Julian Field of Dennison and many others, and they began their work, without funds, and having only the good of the cause at heart. It was found that many people in the state were willing to boost for the organization, but when it came to a question of putting up a little money, these same people, would remain silent. This fact, however did not deter these strong hearted men, and they went forward with the organization, furnishing the necessary funds out of their own pockets. They attended good roads meetings, sent out information, and it was the education work done by such noble men, that aroused the public to action.

The association was carried on two years by such men as those mentioned above with such recruits as they could gather.

At a meeting held in Dallas, in October 1910, these officers, while not yielding to any one in their interest in the cause, announced that they felt that they had carried the work long enough and they would not stand for re-election. Those present urged that they had accomplished too much for the work to stop, and after extending thorough appreciation to them, it was decided to continue the organization, and the following officers were then elected:

President, John W. Warren, San Antonio.
Vice-President, E. W. Kirkpatrick, McKinney.
Secretary-Treasurer, Homer D. Wade, Stamford.
D. E. Colp, Assistant Secretary, San Antonio.
R. J. Rotts, Engineer, College Station.

These officers have continued to work in harness and with the work of those who have gone before, and with their own efforts, the association is now almost on a firm basis. At the recent annual meeting at Fort Worth, W. G. Turner, of Fort Worth, was elected vice-



MR. HOMER D. WADE.

Secretary-Treasurer of the Texas Good Roads Association

met at College Station, and resolved to enter into a permanent organization. Like the first effort, it did not gain much momentum, and soon its funeral was noted.

It was in 1910 that the first meeting was held that could really be considered representative of the entire state. In the early part of that year, the Agricultural

president while the other officers given above were re-elected to their respective positions.

The association has devoted most of its energies to educational work and not until the past few months has it undertaken to extend its financial resources.

In 1912 it devoted a great deal of its efforts to securing the enactment of the law providing for a State Highway Commission, and a state highway engineer. By the persistent efforts of its officers such a bill was passed, but received the disapproval of the governor and hence did not become a law. The association still believes in such a law and will continue its efforts in that direction.

It has also gone on record as favoring an amendment to the state constitution permitting the majority vote to carry bond issues for permanent road improvement rather than two-thirds majority as at present.

In the year 1912 there was four million, six hundred and eighty-three dollars voted for bond issues, and in 1913 seven million dollars was voted. More than three million have been voted thus far in 1914 and this will show the results of the Texas Good Roads Association.

The Texas Good Roads Association is in the strongest position now of any time in its history. It has the cordial co-operation of the Texas Federation of Women's Clubs, of the Texas Mothers' and Parent Teachers' Association, the Texas Business Men's Association, the Texas Industrial Congress and many other strong industrial and civic organizations of the state. It meets semi-annually and the meetings are characterized by the practical demonstrations given, the intense earnestness manifested, and the large attendance of people from all over the state.

The object of the Texas Good Roads Association is to encourage good roads everywhere. We are trying to get together funds sufficiently large to justify the association in keeping at least one man who should give his entire time to the work and to have others that we can send to counties to aid them in their movements

for improved highways. An instance of this has just been consummated in which three officers of the Texas Good Roads Association went to McLennan county and through the assistance given by these officers, the county voted a million dollar bond issue. The association not only desires to give its aid and co-operation in these matters but its object is to give expert information with reference to the construction and maintenance of roads, proper material, etc., etc. Its further object is to assist the counties in getting better prices for the bonds when issued, and its final object is to secure much needed legislation upon the good roads question, including a state highway commission and a state highway engineer.

Surely everyone will agree that the above program, while an ambitious one, is practical, and if the state organization can secure the co-operation indicated, then its plan can be carried into operation. Will you not lend us your assistance in behalf of the cause of better roads for Texas?

Shaming the Authorities.

This little good roads story comes from Wales, by way of London, England:

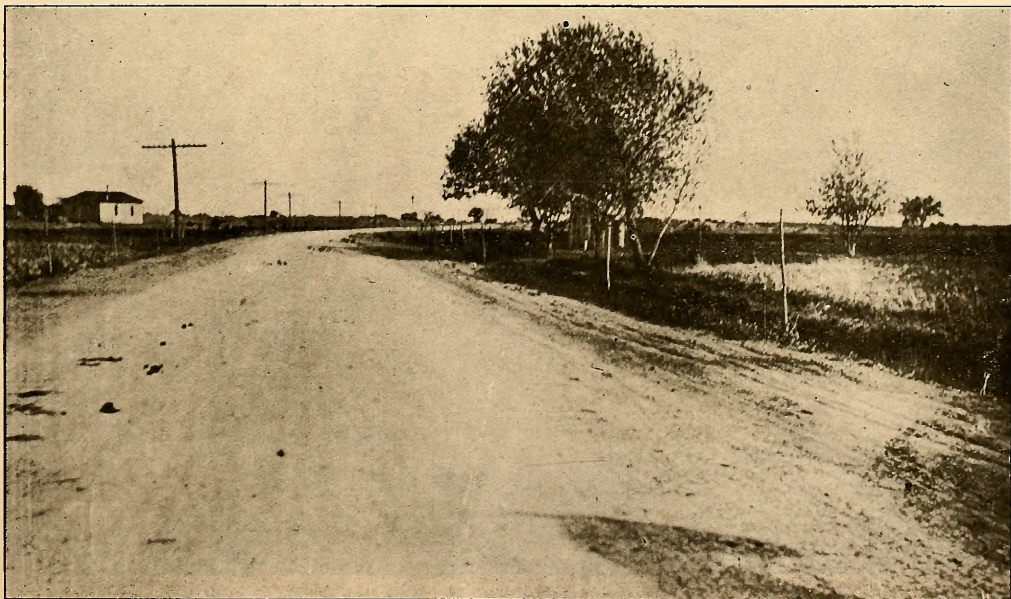
A novel method of shaming a local authority has been adopted by women in West Wales.

Equipped with shovels, pruning hooks, etc., a contingent of forty women in Hook set out to repair an almost impassable road leading to the ancient market town of Haverfordwest, some four miles away.

This was done to shame the local authorities, who were recently petitioned by over 400 householders to take over and maintain the road as a highway.

The road is almost impassable for over a mile, and as the women attend the market town every Saturday they suffer considerable inconvenience.

The alternative pathway is along the beach, but this is only available when the tide is out.



Bituminous Macadam Road Near El Paso, Texas, built by the U. S. Office of Public Roads as an Object Lesson Road.



GOVERNOR COLQUITT, OF TEXAS.

GOVERNOR'S OFFICE
AUSTIN, TEXAS.

O. B. COLQUITT, GOVERNOR.
J. T. BOWMAN, PRIVATE SECRETARY.

March 16, 1914.

Mr. H. B. Varner,
Lexington, N. Carolina.

Dear Sir:-

I have your letter of February 12th. I am very sorry that I have not had the time to write such an article, for publication in your paper, on Good Roads, as you ask me to contribute.

There is a great awakening on the Good Roads question in Texas. In many Counties like Dallas, Tarrant, Grayson, Ellis, Navarro, Bexar, Harris, McLennan, and many others that I do not now recall from memory, have voted bonds for the purpose of building first-class roads.

As you doubtless know, there are 250 Counties in Texas, and the Commissioners Court, consisting of the County Judge, and four County Commissioners, constitute the road officers of each County, together with the overseers who are by law appointed or employed by the Commissioners Court.

At the last special session of the Legislature, in harmony with the Democratic Platform adopted at San Antonio, in August, 1912, at the time of my renomination, the passage of a bill was urged, creating the office of Highway Engineer, who should be required to cooperate with the County Officials and Engineers employed by them, and to see that roads being built were uniformly laid out and constructed.

I further recommended that a reasonable tax, on the basis of value of automobiles, be imposed, collected, and paid into the State Treasury; and be appropriated for, and subject to use in building public highways. I estimated that such a tax would produce approximately \$300,000.00 per annum.

Under our Constitution, the State, as such, has absolutely no jurisdiction over, or authority to build good roads. This, under our Constitution, is made the particular duty of Counties, through their Commissioners Courts.

But I ventured to suggest that a fund collected from automobile owners, as proposed, could be appropriated and expended by the State Highway Engineer, on the approval of the Governor. The method which I suggested is that the State could propose to Counties building Good Roads that for every two dollars appropriated and expended by the County, the State would appropriate and expend one dollar, from the State fund already referred to; thus paying one third of the cost of building Good Roads from the State tax collected from automobile owners. I conceived the idea that such a policy would greatly stimulate Good Roads building in the various Counties of the State.

Our general road laws are local option in their nature, and a precinct in any given County may, by a vote of the property tax payers, issue bonds for the building of Good Roads in such precinct, and act independent of the County, or any other precinct therein. This law has greatly stimulated good road building, for when one precinct in a county builds Good Roads, and the advantages of them are thereby fully demonstrated, other precincts in the County do likewise.

Some three or four years ago, the County Seat Precinct in Ellis County, embracing the town of Waxahachie, voted an issue of bonds and built good roads throughout that precinct. Ellis County is one of the richest in the State in soil, and one of the most populous, being in the black land belt of North Texas. It is full of good, enterprising, and prosperous towns; and after the good roads in the Waxahachie precinct were completed, it was but a short while until the people of Ennis, and other precincts in the County voted bonds for good roads. Townspeople who had theretofore been opposed to taxing themselves for Good Roads, after they saw the trade of their towns going to Waxahachie, were only too willing to vote for issues of bonds for building Good Roads.

I am sorry that I haven't the time to write you a longer letter for publication in your paper. There is great progress being made, however, in Good Roads building in Texas, and since I have been Governor, I have encouraged in every legitimate way possible, the building of Good Roads.

Yours truly,

O. B. COLQUITT, Governor

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Seven Million Dollars For Good Roads in the State of Texas

THERE were 86 road and bridge bond elections held in Texas during 1913 and fifty-one of them carried by large majorities, resulting in the appropriation of \$7,267,000 for highway improvement, according to data compiled by the Texas Business Men's Association. This is more than double the amount of bonds issued in this state last year. The aggregate amount of bonds voted on in 1913 was \$11,661,000, but 35 of the issues, involving a total of \$4,394,000 were defeated. This amount of money is sufficient to build a first class highway from the Red river to the Gulf, and provide for its maintenance for a period of five years.

Harris County Leads.

Harris led all other counties in the amount of bonds issued, having ratified an election of \$1,000,000 on February 20th. The smallest issue for the year was voted on in Kerr county, and was for \$2,000. The election was carried by an overwhelming majority, and a heavy vote being polled. Brazoria county takes the palm for holding the greatest number of elections. Four issues, aggregating \$585,000 were voted on in 1913 and all received the necessary two-thirds majority vote.

The Record by Years.

The law governing the issuance of bonds for highway improvement permits a county, precinct or road district to bond its property for amounts not exceeding one-fourth of the assessed valuation. This statute went into effect in 1909, and since that time nearly \$25,000,000 has been appropriated in this manner for road building and maintenance. The largest amount was voted in 1911, when \$8,915,000 in bonds were issued. The record, by years, since the passage of this law, follows:

| Year | Amount of bonds |
|----------------|-----------------|
| 1909 | \$ 781,000 |
| 1910 | 4,015,000 |
| 1911 | 8,915,500 |
| 1912 | 3,496,200 |
| 1913 | 7,267,700 |

These figures, with the exception of 1909, are taken from records kept by the Texas Business Men's Association, and are compiled from data furnished by commercial organizations, county judges, good roads associations and other authoritative sources. The 1909 figures are from a statement issued by the state comptroller and represent the bonds registered in Austin during the year.

Following is a list of the counties which issued road and bridge bonds during 1913. The amount and date of elections are also shown:

| County. | Date. | Amount. |
|--------------------|-------------------|-----------|
| Atascosa | Feb. 8 | \$ 20,000 |
| Aransas | Aug. 30 | 155,000 |
| Bell | Dec. 20 | 30,000 |
| Bell | Jul. 22 | 50,000 |
| Bell | May 17 | 150,000 |
| Brazoria | Apl. 19 | 300,000 |
| Brazoria | Aug. 30 | 75,000 |
| Brazoria | Aug. 20 | 150,000 |
| Brazoria | Sep. 23 | 60,000 |

| | | |
|----------------------|-------------------|-----------|
| Bexar | Nov. 12 | 750,000 |
| Brewster | Dec. 20 | 100,000 |
| Calhoun | Sep. 20 | 5,000 |
| Calhoun | Jan. 2 | 135,000 |
| Cameron | Mch. 13 | 20,000 |
| Chambers | Mch. 15 | 100,000 |
| Caldwell | Oct. 14 | 50,000 |
| Collin | Dec. 16 | 450,000 |
| Frio | Feb. 1 | 80,000 |
| Galveston | Sep. 26 | 250,000 |
| Grayson | Jul. 18 | 35,000 |
| Garza | Oct. 11 | 50,000 |
| Harris | Feb. 20 | 1,000,000 |
| Hill | Nov. 22 | 250,000 |
| Irion | Sep. 27 | 20,000 |
| Jackson | Oct. 4 | 60,000 |
| Jim Wells | Oct. 25 | 125,000 |
| Kerr | Dec. 13 | 2,000 |
| Kerr | May 12 | 40,000 |
| Kinney | Nov. 14 | 80,000 |
| Midland | Apl. 22 | 50,000 |
| Matagorda | Mch. 1 | 300,000 |
| Montgomery | Nov. 26 | 150,000 |
| Montgomery | Jul. 5 | 250,000 |
| Milam | Apl. 18 | 50,000 |
| Milam | Apl. 25 | 150,000 |
| Maverick | Sep. 8 | 25,000 |
| Navarro | Jun. 28 | 75,000 |
| Navarro | Mch. 22 | 400,000 |
| Nueces | Mch. 22 | 100,000 |
| Nueces | Sep. 2 | 165,000 |
| Polk | May 24 | 40,000 |
| Robertson | Jan. 21 | 150,000 |
| Smith | Aug. 28 | 30,000 |
| Smith | Jul. 8 | 300,000 |
| Smith | May 15 | 75,000 |
| Trinity | Sep. 16 | 100,000 |
| Victoria | Apl. 26 | 45,000 |
| Victoria | Apl. 26 | 45,000 |
| Waller | Dec. 20 | 10,000 |
| Waller | Sep. 25 | 15,000 |
| Walker | Nov. 14 | 150,000 |

Total \$7,267,000

Two-Thirds Law Hurts.

State statute requiring the issuance of highway improvement bonds only by the sanction of two-thirds of the voters balloting, has been a stumbling block in the way of better roads. At least 80 per cent of the defeated issues during the year received a majority of the votes cast, but lacked the required two-thirds ratification by a few ballots.

Elections were defeated during the year in the following counties:

| County. | Date. | Amount. |
|--------------------|-------------------|---------|
| Bee | Jul. 23 | 100,000 |
| Caldwell | Jan. 30 | 40,000 |
| Cottle | Jun. 28 | 50,000 |
| Colorado | Mch. 26 | 100,000 |
| Callahan | Feb. 15 | 75,000 |
| Dallam | May 23 | 10,000 |
| Dickens | Mch. 8 | 100,000 |
| Eastland | Feb. 14 | 50,000 |

| | | |
|--------------|----------|---------|
| Eastland | Feb. 18 | 60,000 |
| Edwards | Dec. 27 | 100,000 |
| Freestone | Dec. 16 | 50,000 |
| Freestone | Dec. 16 | 100,000 |
| Hidalgo | Jun. 18 | 200,000 |
| Hays | Apl. 11 | 100,000 |
| Henderson | Apl. 5 | 100,000 |
| Hardin | Aug. 21 | 65,000 |
| Jefferson | May 22 | 500,000 |
| Jefferson | Oct. 15 | 500,000 |
| Kendall | Jun. 17 | 25,000 |
| Kendall | Jun. 17 | 20,000 |
| Lavaca | Feb. 3 | 100,000 |
| Limestone | Apr. 15 | 75,000 |
| Montgomery | Sept. 20 | 250,000 |
| Matagorda | Sept. 13 | 25,000 |
| Matagorda | Nov. 22 | 75,000 |
| Navarro | Jul. 9 | 40,000 |
| Nueces | Jul. 19 | 500,000 |
| Polk | Apr. 26 | 200,000 |
| Palo Pinto | Nov. 22 | 200,000 |
| Red River | Jul. 12 | 200,000 |
| Robertson | Jan. 21 | 150,000 |
| Smith | Aug. 19 | 40,000 |
| San Patricio | Nov. 26 | 14,000 |
| Val Verde | Nov. 25 | 165,000 |
| Waller | Dec. 20 | 15,000 |

Total \$4,394,000

Farmers Want Better Roads.

The average county tax rate in the communities where the bonds were defeated is invariably lower than those that issued bonds and, as a rule, the average haul to market is longer and the farm tonnage greater. Dur-

ing the past year it has been the rule, rather than the exception, that the rural vote has been cast for better highways. Incessant rainfall, by rendering the roads impassable, has kept the farmers away from market a large part of the year, and by not having good highways, he has been impressed with the value of them.

Practically everyone of the counties in which issues were defeated in 1913 are making preparations to hold the second election and in many instances the road districts are being mapped out to exclude those voters opposed to bond issuance for highway improvement. At the present time, elections involving \$4,000,000 are in sight and will be decided during the first three months of 1914.

The record of the bond issues by months is an interesting one. November was the banner month, when elections aggregating \$1,380,000 were carried.

| Month. | Bonds Voted on. | Bonds Issued | Bonds Defeated. |
|-----------|-----------------------|-----------------|--------------------|
| January | \$ 475,000 | \$ 285,000 | \$ 190,000 |
| February | 1,385,000 | 1,100,000 | 285,000 |
| March | 1,140,000 | 920,000 | 220,000 |
| April | 1,115,000 | 640,000 | 475,000 |
| May | 815,000 | 305,000 | 510,000 |
| June | 350,000 | 75,000 | 275,000 |
| July | 1,475,000 | 635,000 | 840,000 |
| August | 515,000 | 410,000 | 105,000 |
| September | 915,000 | 640,000 | 275,000 |
| October | 785,000 | 285,000 | 500,000 |
| November | 1,834,000 | 1,380,000 | 454,000 |
| December | 857,000 | 592,000 | 265,000 |
| Total | \$11,661,000 | \$7,267,000 | \$4,394,000 |



Completed section of gravel road in Temple precinct, Bell County, Texas, built under the supervision of the U. S. Office of Public Roads

Tarrant County Roads

By. J. C. TRAVILLA

Highway Engineer, Tarrant County, Texas

A MODERN road system to the extent of about 133 miles is now under construction in Tarrant county which are being built out of asphaltic oil, cement, refined tar and crushed stone, under a bond issue of one million dollars, voted by the people of the county.

Fort Worth is the county seat, and as the city pays 83% of all the taxation of the county a personal and lively interest is manifested in these roads by the citizens of Fort Worth, as well as the residents of other parts of the county.

These roads are planned on a comprehensive system, designed to best serve the interest of the people of both the county and city, and those of adjacent counties who do business in Fort Worth.

All the roads radiate from Fort Worth, eight in number, now known as cardinal and sub-cardinal roads, for the reason that they follow, in a general way, the cardinal compass directions, the subcardinal roads being within the intervening 45 degree angles.

The gravel for the roads in this county is not adapted for a wearing surface on hard roads, it being soft and containing an excess of clay. This material is

hot and under pressure with pressure wagons. The wagon known as the St. Louis Distributer is being used, which will apply uniformly asphaltic cements of 75 penetration.

The sub-base is prepared according to specifications, intended to secure the best possible foundation; especial care being given to secure good drainage of the foundation.

In the asphaltic-macadam the stone is so graded as to obtain the maximum density.

All bridges are of reinforced concrete, and all culverts are of concrete unless very small when vitrified and corrugated pipe are used.

Tarrant county roads are to be placed under a special road law, which provides for the maintenance of the roads after they are built.

All the roads have a macadam wearing surface of from 9 to 18 ft. in width, with gravel shoulders, giving at least, 25 ft. of roadway, and the right of way is 50 feet.

The cost of the roads is averaging from \$5500 per mile to \$8700 per mile, depending on the class of construction, length of haul, etc.

Summary of Road Expenditures in Texas from 1907 to 1914.

The following summary of road expenditures in Texas from the proceeds of bond issues since the passage of the Texas road district bonding law, has been prepared by Mr. R. J. Potts, head of the department of highway engineering, Texas Agricultural & Mechanical College, from records in the office of the State Comptroller:

| | | |
|------|---------|-----------|
| 1907 |\$ | 673,441 |
| 1908 | ..... | 861,150 |
| 1909 | ..... | 2,320,298 |
| 1910 | ..... | 1,919,993 |
| 1911 | ..... | 3,280,780 |
| 1912 | ..... | 5,214,940 |
| 1913 | ..... | 3,818,820 |

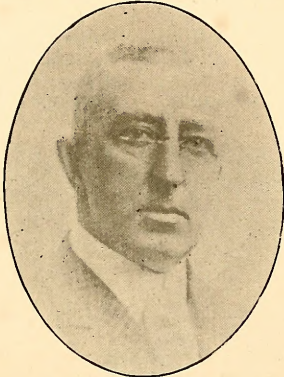
Total for seven years .. \$18,089,422

In addition to the road bonds listed above, each county levies an annual road and bridge tax for current expenditure. The rate will probably average 20 cents on the \$100. With our present assessed valuation of \$2,632,000,000 for the state, this annual tax provides \$5,264,000 which goes directly into road construction and maintenance.

Besides this money income, most counties still retain the five day labor tax by all men between the ages of 21 and 45.

Manatee county, Florida, votes this month on bond issues aggregating \$500,000 for about 100 miles of roads and a bridge across the Manatee river between Palmetto and Bradentown.

On February 14 McLennan county, Texas, voted bonds for \$1,075,000 to build a system of good roads throughout the county. The system mapped out embraces about 185 miles of road and touches every part of the county.



MR. J. C. TRAVILLA

Highway Engineer, Tarrant county, Texas

well adapted for the base of the roads, and limestone of a standard quality shipped in from nearby quarries is used for the surface.

One of the lasting benefits from bond issue expenditure is the grading of the road bed—all of the roads are being graded so as not to exceed a 6% grade. They are being built to eliminate sharp turns and changed in alignment so as to attain a greater directness of course.

The roads were designed by and are being built under the supervision of Jas. C. Travilla of Fort Worth, who was at one time commissioner of highways for the city of St. Louis.

Several methods of construction were adopted: depending upon the character and amount of traffic, property values, etc., from this data the width of the roadway is also established. Class "A" roads, those upon which the traffic is heaviest, are known as asphalt-macadam construction. Class "B" roads are water-bound macadam, with asphaltic oil surface treatment.

The asphaltic oil and asphaltic cement are applied

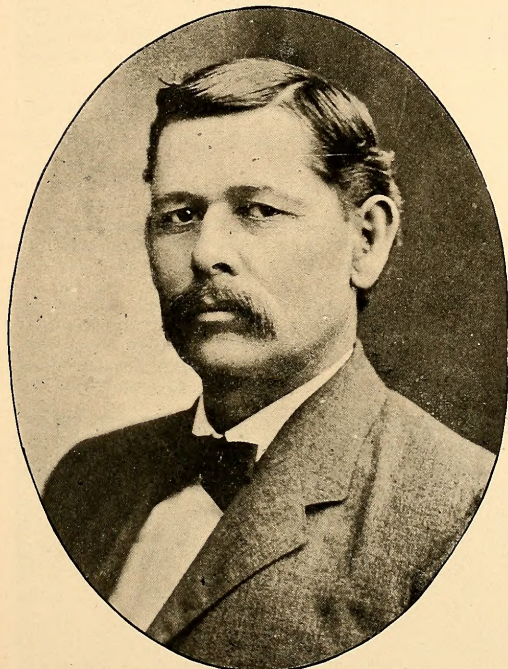
The Rio Grande Military Highway

By MASON MANEY

President Military Highway Association

IN GIVING a short descriptive outline of the movement to induce the United States government to build a military road along the Rio Grande River from its mouth to El Paso, now commonly known as the "Military Highway," it is in order first to say that the general road movement in Southwest Texas had its birth in the formation of the "Highway League of Bexar County," a branch of the Chamber of Commerce of San Antonio, which was formed by a few patriotic and public spirited men of that city a few years ago. Through the influences of that organization many western counties have been induced to establish systems of good roads, which are creditable to any section of country. This has been the work, however, of public spirited men all over the southwest, and was not done

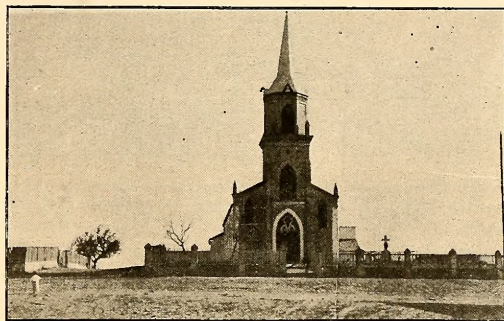
covered that the soldiers who were stationed at Eagle Pass, about forty or forty-five miles up the River, could not get down the River in time to intercept this band to prevent them from crossing the Rio Grande into Mexico. The writer, a resident of Southwest Texas, immediately called the attention of Senator Sheppard of



MR. MASON MANEY, OF PEARSALL, TEXAS
President of the Military Highway Association.

in a day. It was found that by building good roads great stretches of country could be covered in a day by means of the automobile, which is now extensively used in this section by the cowman, farmer and ranchman, and without roads, travel in any direction was a slow and tedious undertaking.

When, in September, 1913, a band of Mexicans rendezvoused in the "Caponos Pasture" in Dimmit county, about thirty-five or forty miles this side of the Rio Grande and captured Eugene Buck, Ex-Sheriff of that county, and Candelario Ortiz, Deputy Sheriff, and fired on Sheriff W. T. Gardener and Ives White, and the same day shot and killed Candelario Ortiz, it was dis-



One of the first churches built in Texas. It is located in the little village of Santa Maria on the Border Highway

Texas to the condition of affairs along the Rio Grande and suggested that it would be a splendid thing if the government would build a highway along that river so that the same might be properly patrolled. The idea was heartily endorsed by Senator Sheppard, who introduced in the senate a resolution to appropriate \$25,000 for the purpose of defraying the expense of making a survey and an estimate of the cost of such a highway, and authorizing the war department to proceed with this work.

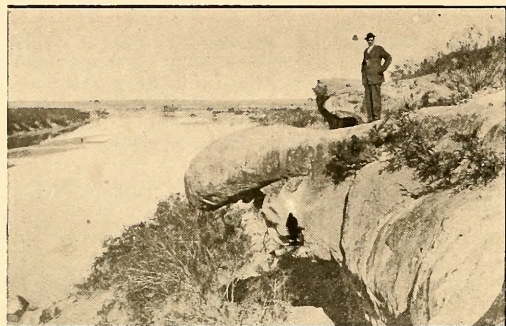
The Chamber of Commerce at San Antonio, Brownsville, Laredo, Eagle Pass and Del Rio were notified that



Post Office at San Ygnacio, Texas, 171 miles from Brownsville. At this point the inspection party was forced to leave the Rio Grande at from one to four miles, a distance of 25 miles

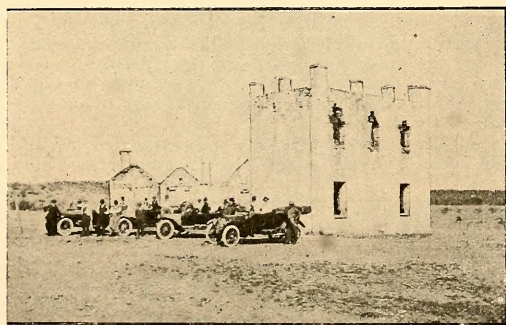
there was a probability of interesting the government in this undertaking, and the citizens of those cities immediately got busy drafting petitions, passing resolutions and corresponding with Senator Sheppard in the interests of this matter. Many meetings were held in

various places endorsing the proposition, and resolutions forwarded to Washington, and in December, 1913, a movement was started by D. E. Colp, of San Antonio that a trip be made from Brownsville to Eagle Pass



R. O. Whitaker, C. E., who donated his services to the inspection party. He is standing at the point which marks the end of the passable road, 111 miles from Brownsville, near the little town Roma.

along the Rio Grande in order to gain information and emphasize the necessity of the road. This was heartily approved by the Chambers of Commerce at Brownsville, Laredo, Eagle Pass and Del Rio, and a party consisting of eight citizens started from Brownsville in three cars January 16, 1914, composed of D. E. Colp, R. O. Whiteaker, W. E. Fitch and B. F. Harper of San Antonio, Mason Maney of Pearsall, S. A. Pipes of Mission, Col. D. P. Gay of Brownsville, and E. R. Rice of Eagle Pass, arriving at Laredo on the following Sun-

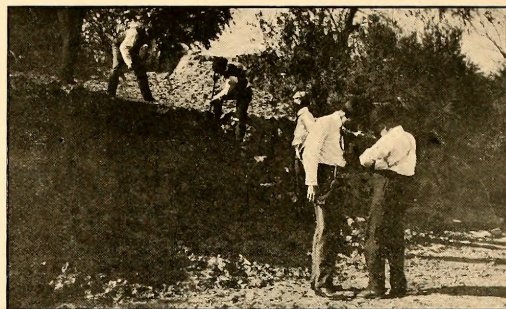


Ruins of an old ranch house that was burned, 3 miles from the Rio Grande and 40 miles west of Laredo. The inspection party in the foreground

day, where new cars and other parties joined the delegation, and reached Eagle Pass on Tuesday, the 20th of January, making the entire distance of three hundred and fifty-one miles in four days and a half.

At Eagle Pass a general road meeting had been advertised and delegates from all over Southwest Texas gathered and were royally entertained by the citizens of that city, and all unanimously favored the military highway project. A permanent organization was formed to look after the success of the measure, with Mason Maney of Pearsall as President, and S. A. Pipes of Mission, Texas, Secretary, and twelve vice-presidents from the several counties along the border. A resolution was adopted that a committee be appointed to go to Washington and present the matter. This action was

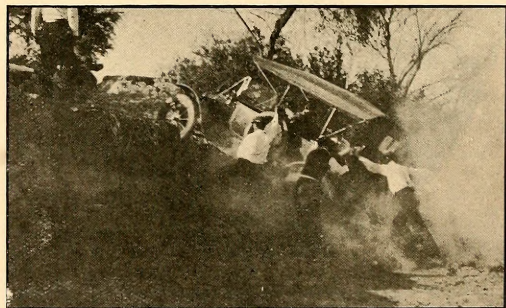
wired Senator Sheppard, who arranged for the committee to meet the committee on military affairs at Washington on the 26th of February. This delegation of Texans who went before the committee on military affairs was composed of C. O. Austin, chairman of the highway league of the Chamber of Commerce at San Antonio, Col. D. P. Gay and M. J. Slattery of Brownsville, Sam Mackin of Laredo, F. V. Blease and Judge John Sanford of Eagle Pass, R. O. Whiteaker, a civil



Digging down a five foot bank with one spade to get the inspection party automobiles out of the creek. The picture following shows how they pulled out

engineer of San Antonio, and Mason Maney of Pearsall. Senator Sheppard arranged the hearing before the sub-committee on military affairs, and after hearing the matter discussed and the facts presented, this sub-committee on military affairs unanimously agreed on a report to the full committee, and which report gives all the reasons assigned for the building of this road, and is here given in full:

"We, your sub-committee on military affairs, to which was referred S. J. R. 98, authorizing a survey and examination of the Rio Grande border of the United States to determine the advisability of constructing a highway either along the entire border or certain sec-



One way of getting an automobile over the Border Highway. The sand is very deep.

tions thereof, beg leave to report the same with the recommendation that the resolution be reported favorably to the senate.

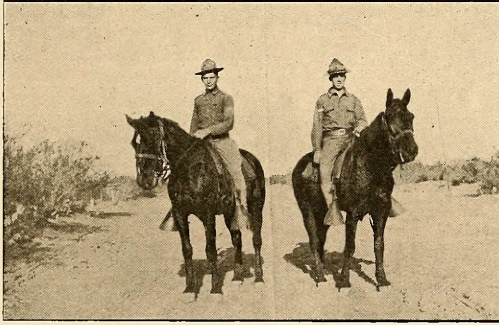
"A representative committee of citizens living along the border appeared before your sub-committee on Thursday, Feb. 26, and presented very strong argument in support of the resolution.

"Your sub-committee finds that—

"(1) This road would be a great aid to the treasury department in the enforcement of the revenue laws,

and would be the cause of a great economy in preventing the losses due to the constant smuggling, almost impossible to suppress entirely, and which represents a loss to the treasury department of probably some hundreds of thousands of dollars annually.

"(2) This road would be of signal advantage for strategical purposes and would aid the military authorities effectively in patrolling the frontier of a sparsely settled section, and would prevent the repetition of such outrages and murders as recently took place and which are the subject of the trials in the courts of Texas at the present moment. It would further prevent the constant pillaging of the property of American citi-



Two of Uncle Sam's boys patrolling the border, watching for Mexican bandits
Note the depth of the sand.

zens along this border by irresponsible bandits who are constantly passing at will between Texas and Mexico.

"(3) The construction of this military highway would in all probability lead to the settling up of the territory along the border, and the protection thus afforded would reduce the cost of protection of a vast section of territory.

(4) The moral effect caused by the construction of this road would be felt immediately, as being an indication of what our government is willing to do in case of necessity, and would go a long way toward reassuring the people of this border of the ability of the government to protect their lives and property.

(5) It appears that the value of such a road to this government as a means of enabling the customs authorities to more effectually patrol the border, would be of great value in preventing the large amount of smuggling that is now constantly going on in this territory, and it would further tend to materially reduce the number of violations of the immigration laws, and would greatly facilitate the operations of the postoffice department in its being a useful and necessary post road; and we, your sub-committee, believe this an important means of the government's protecting its citizens along the border.

Your sub-committee has gone thoroughly into this matter and are firmly convinced of the merit of the proposition.

Respectfully submitted,

SENATOR CATRON, of New Mexico.
SENATOR BRADY, of Idaho.
SENATOR MEYERS, of Montana.

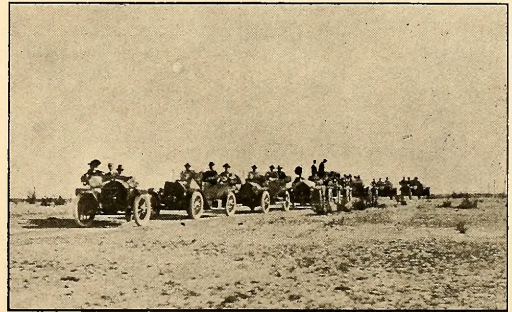
"Sub-Committee of Committee on Military Affairs."

Following this work before the sub-committee on military affairs, Senator Sheppard devoted three mornings with the Texas delegation visiting the secretary of war, secretary of the treasury, General Anson Mills,

chairman of the International Boundary Commission between the United States and Mexico, and the Good Roads Division of the Department of Agriculture, and at each of these departments the necessity and advantage of a road along the Rio Grande was presented, and no note of opposition was sounded by any one, but, on the other hand, all seemed impressed with the idea of the undertaking and promised cordial co-operation. General Mills called attention to the fact that President Roosevelt, by a proclamation issued in 1907, had reserved from entry a strip of land sixty feet wide out of the public domain within the state of California, and the Territories of Arizona and New Mexico, which specified that the said strip so reserved might be used for public highways, but for no other purpose whatever. This proclamation is dated May 27, 1907, and shows that our government has recognized the necessity of a public highway along our boundary line.

The character of much of the country from Brownsville up the river is such that a much greater necessity exists for the construction of a passage way up and down the river than exists above El Paso, for the reason that the country is covered in many places with a heavy growth of mesquite timber, cactus and underbrush, and in many places is rough and rugged and cut up with arroyos, and the work of patrolling is a strenuous proposition, in fact so strenuous that it can not be properly done under existing conditions.

What this government undertakes to do, it ordinarily does intelligently, and as it has undertaken to patrol the border for the purpose of giving proper military protection and to enforce the revenue laws and in some measure prevent the promiscuous immigration of



Reception party meeting Military Highway Inspection Party three miles below
Eagle Pass, Texas

foreigners across the border, it is beginning to realize that these functions can not be performed under the conditions that exist along the Rio Grande without providing a passage way along that river suitable for the purpose named, and friends of this movement now believe that it is a mere matter of time when the border military highway will be built by the government.

Illinois is at work voting township road bonds and using state aid from a legislative appropriation of \$2,000,000 per annum.

Good roads are not competitors of railroads and interurbans; they make business better for both.

The State Roads Commission, of Maryland, has contracted for a road between Federalsburg and Denton to cost \$82,005.02.

Mud Shell Roads in the Gulf Coast Country

By J. M. HOWE

Of Howe & Wise, County Engineers, Harris County, Texas

In the Gulf Counties of Texas the most available material for the construction of paved roads is shell. The country is too young, geologically, to have rock that is hard enough for paving and gravel is usually scarce and obtainable only on bars in the channels of the large rivers.

Clam shell, taken from the banks of lagoons and bays along the coast, are used to some extent, as are also the fresh oyster shells from canning factories, but the supply of these is too limited for extensive work.

Most of the paving work is done with what is called Mud-shell. This material is the partially disintegrated oyster shell forming the reefs which are found in nearly all the bays along the coast of the Gulf of Mexico.

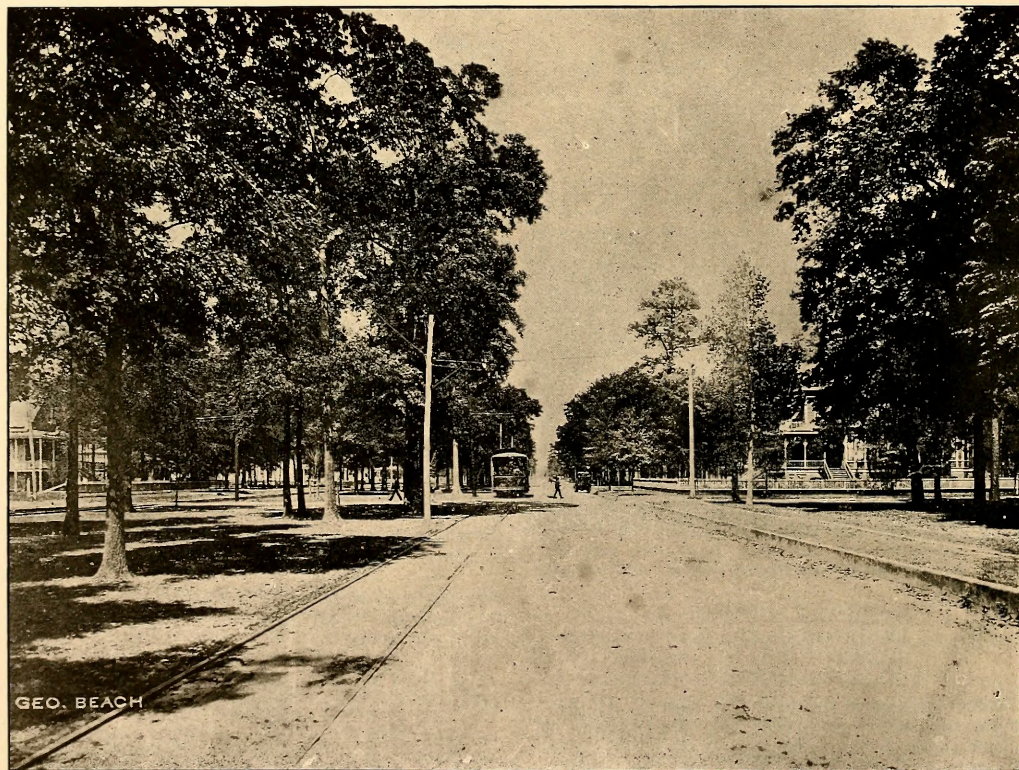
The reefs are the result of ages of accumulation of oyster shell and are composed of varying sized pieces from the small soft particles of very old shell to full size hard fresh shell. The entire mass is bonded together by a blue clay, that fills, and some times more than fills, all voids. The reefs vary in depth from a few inches to ten or twelve feet and cover an area of many square miles.

In the bays that are reasonably close to centers of population, a large industry has grown up in the

dredging and handling of this material. When the demand is small it is usually removed by the use of light draft dipper dredges, but where the business has become established, as it has in Galveston and Sabine Bays, the shell is taken out with suction dredges. The material from the suction dredge is superior to that of the dipper dredge on account of the uniformity in quality of the suction dredge product. The dipper dredge takes out the shell as it is found in the reef, often getting entirely too much mud, while with the suction dredge the material can be given any desired amount of washing by varying the amount of water used. Ten to thirty per cent of mud in the shell is desirable to fill the voids and bond the particles.

The dredged material is loaded on barges and either delivered direct to the consumer on the banks of the navigable bayous or transferred to cars for rail delivery. The transferring to cars is done by clam shell buckets.

The shell is placed on the road in the same manner as gravel, spreading being done more successfully with shovels than by the use of a grader. Rolling is seldom done and has little value. The broken particles of shell are thin flat pieces that no amount of rolling will wedge

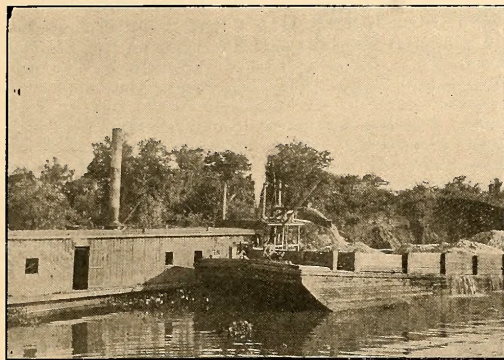


Houston Height Boulevard, Built of Mud Shell.

together. The usual and most successful method of finishing is to turn the traffic on the road and keep the ruts filled by the use of shovels or a grading machine. With mud enough in the shell to fill the voids, this

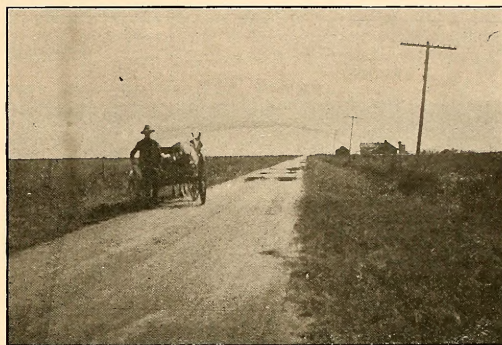
width of the roadway and draw the material from the sides for the filling of the ruts. This leaves the completed road with an extra thickness in the center.

A finished shell road forms one of the most beautiful



Clam Shell Banks, Sabine Lake, near Beaumont, Texas.

method will give good results, but if the shell is washed too clean it will pack slowly and there is a loss through the grinding up of the small particles. Owing to the method of finishing with a grader, some engineers make the paved surface the same thickness for the entire



Clemenc Kozok, road patrol on the Beaumont-Port Arthur Road. This is the secret of the fine shell roads of Jefferson county, Texas. There is constant maintenance.

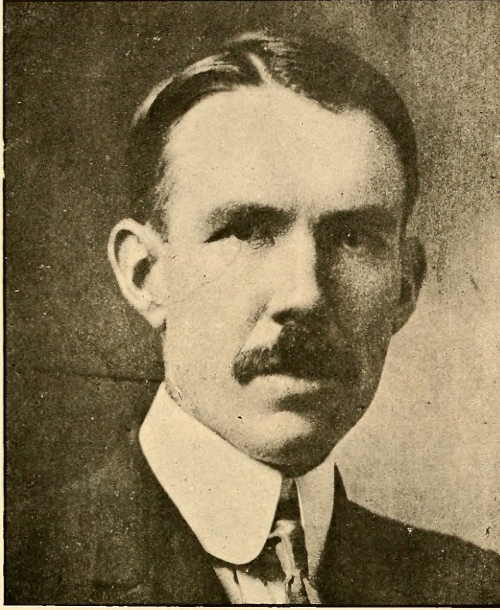
surfaces for vehicular traffic imaginable. The white road, while somewhat glaring and trying on the eyes, is so smooth that it invariably attracts the attention and interest of visitors. Unfortunately the material is



Clam Shell Road, part of the Webster-Seabrooke Highway, in Harris County, Texas.

so soft that it wears readily and makes a fine dust that is disagreeable not only to the users of the road but to adjacent residents.

Dust prevention by the use of petroleum products has not so far proven effective. Asphaltic mats, using heavy oils, seem to lack bond and break away from the surface. This lack of bond is due, at least in part, to the physical condition of the surface which is compos-



MR. J. M. HOWE, OF HOWE & WISE
Highway Engineers, Harris county, Texas

ed of shell particles lying flat or nearly so, thus making it necessary for the oil to penetrate horizontally. Experiments are still being made along these lines as well as with Calcium chloride.

On heavily traveled roads with much horse drawn traffic, mud shell is too soft for a permanent pavement, but on light traffic roads and in parks it makes an ideal construction. It has recently been found that mud shell can be used to great advantage as a foundation for hard surface pavements such as asphalt macadam or other bituminous bound materials. This latter use has opened up possibilities for the utilizing of many miles of shell roads that it was feared would be completely lost owing to the traffic having become too heavy to make their further maintenance with shell surface economically possible.

New Austin-Western Catalogue.

The Austin-Western Road Machinery Company are sending out their new catalogue of Austin Tandem Motor Rollers. The catalogue is beautifully illustrated with cuts showing the roller at work under all sorts of conditions and also showing the distinctive features of the machine in detail. The new machine marks a decided advance in road building equipment and the catalogue should prove very interesting to the readers of Southern Good Roads.

THE VALUE OF GOOD ROADS TO ELLIS COUNTY, TEXAS.

By Judge O. E. Dunlap.

First President Texas Good Roads Association.

THERE has never been a time in which a greater interest in good roads is so manifest as now. This interest in a better system of highways is very pronounced in Texas. This has been accentuated in a marked degree by the enactment of the District Road Law. This law permits the organization of road districts in a county. On petition of the citizens of any road district, so organized, an election is held to vote upon the issuance of bonds with which to build good roads. To issue bonds, for such purpose, requires two thirds of the tax paying voters to favor same. Experience has shown that it is much easier to vote road bonds in a district than a county. And also, that when one district votes bonds, and builds good roads, only a short time elapses before the entire county adopts the same plan to procure roads. Last year, under the district system, about \$7,000,000.00 in bonds was issued. The present year bids fair to exceed that sum. The black waxy land section of Texas, in wet weather, is of such nature as to stop all transportation without pikes. Ellis county has a black waxy soil. The first road district, under the present law, was organized embracing Waxahachie. Bonds for \$250,000 were voted, issued, and sold. With the proceeds, one hundred miles of good gravel pikes were constructed. All wooden culverts were removed and fine concrete culverts substituted. The tax to pay interest, and provide a sinking fund to redeem the bonds was 25 cents on the \$100. This tax has been reduced to 20 cents. Since the organization of this first district, eight others have been added, which virtually embraces all the county. The aggregate issue of bonds for the nine districts is \$980,000. With this money there has been built 300 miles of fine pike roads. Enough money is on hand to build about 30 miles more. I feel safe in saying that more miles of good pikes have been built in Ellis county within the same period than in any county in the union. This may seem a bold statement but it is true. The construction of these pikes began in October 1909. The great benefit from such a system of roads is incalculable.

Ellis county produces, on an average, 150,000 bales of cotton annually. This cotton, in the seed, amounts to 120,000,000 tons. It costs 25 cents to haul a ton one mile over a dirt road. If this be true, then it costs \$30,000 to haul this crop one mile. If the average haul from the field to gin is three miles, then it would cost \$90,000 to haul the cotton crop of Ellis county to gin. It is estimated that it costs about 12 cents to haul a ton over one mile on a good pike. If this is true, the farmers of Ellis county save annually, by our pikes, \$45,000. This is only one item of saving. There are many others. I estimate that there is a saving of more than \$100,000 annually to our farmers by reason of the pikes. There are other elements of great benefit to the people from good roads other than dollars. The ease and comfort with which a family can get to town, church and school is a benefit which cannot be overestimated. The result is far happier and more prosperous people. With good roads and more automobiles, there will be general a movement back towards the farm.

Construction work is progressing in Washington, Russell and Tazewell counties, Va., on the Bristol-Bluefield highway, and 67 of the 92 miles of this highway will be graded and macadamized before next winter.

The Texas State Automobile Association and Good Roads

By F. E. KEITH

President Texas Automobile Association, Dallas, Texas

IT IS DOUBTFUL if there has been a period in the history of this government, when so universal and rapid a change in public sentiment has been experienced, in so short a space of time, as that of the past four or five years, relative to the matter of good roads.

To the close observer, there is no force or class that has done so much to hasten this good roads sentiment,

more effort along other lines, as autos were "a new innovation," and were the object of every "would-be-popular politician" who was playing for popular sentiment, by trying to find some new scheme of law that would double tax all owners thereof.

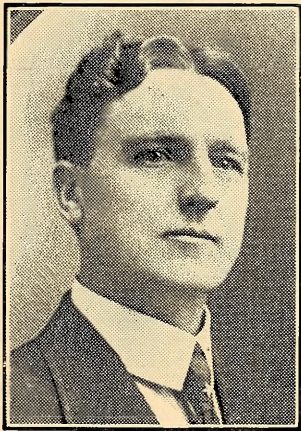
Owing to the greater per cent now being purchased in this state by farmers, and retired farmers, this double taxation craze is fast waning, and automobile owners in Texas, it is hoped will no longer be made the cheap politician's "goat."

The Texas State Automobile Association the past year has therefore directed the efforts of the association along lines of good roads, and organizing the larger cities of the state for co-operation in this most laudable work, and the results have been most gratifying.

At the last annual meeting of the state association comparatively few of Texas cities were affiliated, and actively co-operating in the work, but as a result of the stressing of the good roads feature of the association, more than fifty-five of the leading counties of the state have organized local automobile clubs, all of which are affiliated with the State Automobile Association, and through the state association, with the national association—the A. A. A.

The membership of these local clubs number from 40 to 900 each, Dallas leading the state with the Dallas Auto Club with a membership of over 900.

In fact the state has now just reached the stage where a colossal work can be accomplished, because of its



MR. F. E. KEITH,

President Texas Automobile Association, Dallas, Texas.

as the automobile owners, and particularly is this so in Texas. All realize now that the automobile is here to stay, and is as much a necessity and convenience as any invention of recent times.

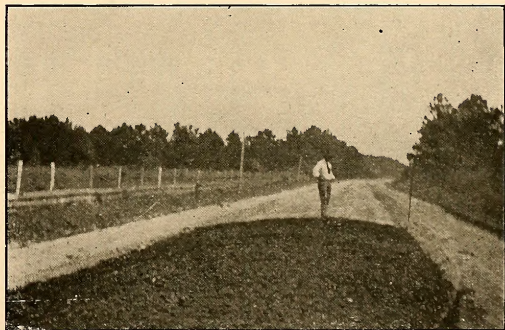
The farmer, with few exceptions, no longer looks upon the auto driver with disfavor, but instead is contemplating the purchase of a car or now owns one, or is directly or indirectly reaping the benefits of rapid transportation, and improved social conditions through their use in his community.

Another factor that has had much to do with hastening the good roads movement, is that of rural free delivery of mails by the government, and this great boon to the urban population is but in its infancy, and together with the parcel post is going to necessitate a greater and greater use of the automobile, as well as bettering the rural roads through the whole country.

What are the automobile associations doing toward the good roads movement? More than is being done by any other one force in Texas.

In fact the Texas State Automobile Association during the past year has accomplished more through the influence of the local auto clubs, in actual miles of good roads constructed; in favorable action on good roads bond issues; in spreading good roads influence and information, than has been accomplished in this state in any four consecutive years.

The Texas State Automobile Association, like most other state auto association, heretofore has devoted



U. S. Object Lesson road in process of construction in Orange county, Texas. Gravel has just been spread to a depth of 8 inches but not rolled

great influence and numerical strength, in the good roads cause, and it is to be hoped that there will be but one object considered by the delegates at the Dallas State Convention, on April 23rd—and that results.

The inter-state correspondence that is carried on by this association, and its far-reaching effect on prospective settlers as well as tourists, opens a field limitless in its possibilities, and one that should be greatly enlarged upon by the corresponding secretary.

No officer of the state association receives a penny for services in any manner, except the secretary-treas-

urer and the annual dues of \$1.00 is all the cost after affiliation with state association. This is much less than that charged by most other states.

The fact is the "racing idea" of the automobile owner is a thing of the past, and the "speed maniac" is not as afraid of the officers of the law, as he is of the members of the several automobile clubs of the state, who are making an organized effort to rid the autoists of the state of the odium brought upon the whole, by an "irresponsible rattle-headed" few.

The movement for annual good roads day (or days) was proposed and pushed to success by the Texas State Automobile Association, likewise the great success and phenomenal results accomplished along the Southern National Highway—Texarkana to El Paso, the Denver to Gulf Highway—Denver to Corpus Christi, via Galveston, the Dallas-Gulf Air Line and numerous other partially completed routes, are but illustrations of the

combined co-operative effort of the automobile clubs of Texas.

The Texas State Automobile Association furnishes each of its members a "certificate of membership," which is also a passport in every state, as well as Texas, to all the benefits of the American Automobile Association, in way of hotel accommodations, garages, etc., etc., and also furnishes each member free of charge annual subscription to the American Motorist, the greatest motor journal in the country.

All in all, there is not the slightest excuse, for any city of 2,000 population or more, or any county to be without an automobile club, and it is the present plan of the Texas State Automobile Association to have every section of the state organized early the coming season.

Full instructions and by-laws are furnished free to all interested localities.

What McLennan County Will Do With Her Big Bond Issue

By R. J. WINDROW

Highway Engineer, McLennan County, Texas

ON the 14th of February, the people of McLennan county, Texas, voted favorably for the issuance of bonds to the extent of one million seventy-five thousand dollars for road and bridge improvement in Road



MR. R. J. WINDROW

Highway Engineer, McLennan county, Texas

District No. 2. This Road District is made up of Justice Precincts No. 1 and 3, and comprises a territory extending through the central portion of the county

from its northern to its southern boundary, an area of approximately one third of the county or about four hundred square miles. The city of Waco, which lies almost in the center of this Road District, has a population of about forty thousand. The total population of the Road District is approximately sixty thousand and the assessed valuation is about thirty-six million dollars, of which there is something like thirty-two million dollar valuation within the corporate limits of Waco. The bond issue recently voted will necessitate a tax rate for the first year of twenty-two cents on the hundred dollar valuation. Practically all of the territory in this Road District is under cultivation and is considered some of the very best land in Texas.

Within the past few years there have been a number of elections upon the road bond proposition in this county. The first attempts were made to carry bond issues for the county as a whole. These were always decisively defeated. The city usually gives a majority vote for the bonds, while the proposition has always been overwhelmingly defeated in the country boxes. In 1910 the people in Justice Precinct No. 5, McGregor being the largest town in this precinct, voted an issue of one hundred thousand dollars for road purposes. With this money something like sixty miles of roads were surfaced with gravel.

The success of the recent election is no doubt largely due to the fact that the people were informed beforehand exactly how the money was to be expended. Maps were prepared showing just which roads were to be improved, and even the type of construction of each section of these roads, together with the estimates of the cost of same. Data was also compiled before the election giving the tax rates necessary for retiring the bonds when they come due, thus enabling each citizen to calculate in advance just what it would cost him in dollars and cents to have good roads in his community. The preparation of such plans and estimates before a bond election is no doubt the proper business procedure, but it is very seldom carried out as in this case.

It is proposed to improve approximately one hundred

eighty miles of roads with the proceeds of this bond issue. Three general types of roads will be constructed, the first class being bituminous bound macadam; the second class, water bound macadam; and the third class, gravel roads. The width of the bituminous surfacing will be ten, sixteen and eighteen feet, depending upon the amount of traffic, which each road is expected to take care of. The ten feet surface will have oiled graveled shoulders three feet wide on each side. The surface of the entire system, including the graveled roads, will be oiled. All of these roads will have an average total depth of ten inches. The maximum grade line will be six per cent.

It is planned to construct all of the culverts and small bridges of concrete, and the larger bridges of steel. There will be twenty-four bridges to be constructed ranging in span from fifty to two hundred feet.

The accompanying map shows the proposed general plan for the road system, the typical section of the roads, and the mileage of each type of surfacing. The total approximate mileage of the three general classes of roads is as follows: bituminous bound macadam, seventy-three and one half miles; water bound macadam, eighteen and one half miles; graveled, ninety and one half miles.

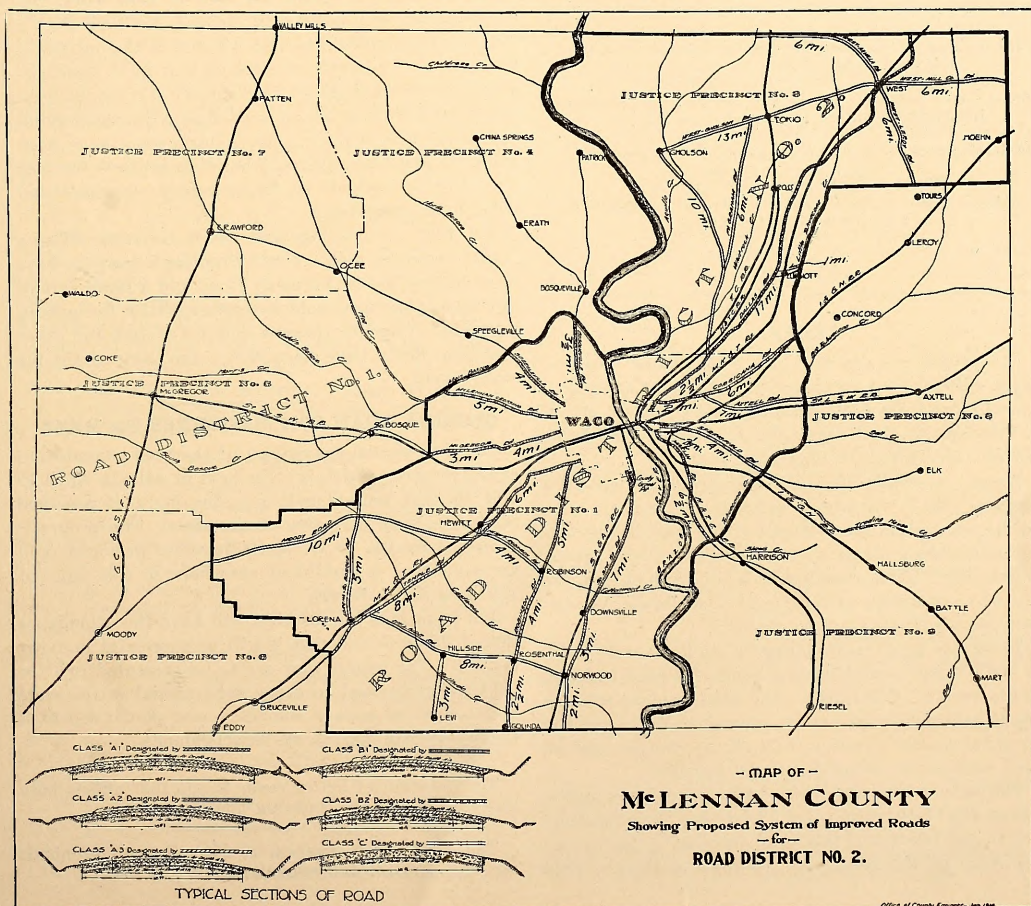
The plans and estimates are of course only preliminary. Forces are at present engaged in making detail

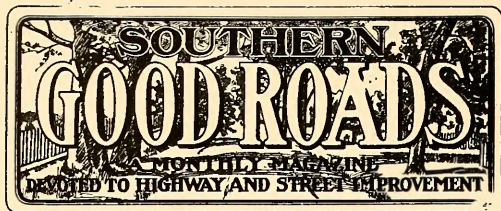
surveys of all of the roads, and preparing plans and specifications for the improvement of the same. Special attorneys have also been employed to attend to the legal work attached to the preparation of the bonds in the proper shape for sale. It is expected to have all arrangements completed for letting contracts for this work within about ninety days.

An advisory committee, composed of five of the best business men in the road district, has been appointed by the several business men's organizations in the Road District, to sit with and advise the commissioners court upon all matters pertaining to the expenditure of the bond issue money. The work, which will be done by contract, will be under the immediate supervision of the county engineer.

The movement for a road bond election in Road District No. 2 was first started by the directors of the Young Men's Business League of Waco, and was immediately taken up by the directors of the elder organization, the Waco Chamber of Commerce. To these two organizations should be given much of the credit for the business like way in which the campaign was conducted.

The Texas Good Roads Association rendered invaluable assistance in this campaign by sending some of its leading members to various places in the Road District to make good road speeches.





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APRIL, 1914.

No. 4.

TEXAS.

This month we are devoting considerable space to Texas. We present articles of unusual merit from Governor Colquitt, Prof. R. J. Potts, Judge Dunlap, Mr. J. C. Travilla, Mr. J. F. Witt, Mr. J. M. Howe, Mr. J. W. Warren, Mr. Homer D. Wade, and others.

We are especially indebted to Professor Potts for his services. He it was who "engineered" the project for us, interesting the road officials of the state in the matter and securing nearly all of the articles which appear in this, our "Texas Number." We have had, too, the earnest co-operation of the Texas Good Roads Association, for which we are very grateful.

Texas has done great things in the last seven years. In 1907 Texas counties issued bonds for road building to the amount of \$673,441. The good roads movement has gained momentum every year since that time and up to the first of January, 1914, Texas counties had issued road bonds amounting to \$18,089,422.

The banner year was 1912, when bond issues aggregating \$5,214,940 were voted. Last year the total dropped to \$3,818,820 but this year promises to far exceed any year of the past. As recorded elsewhere, road

bonds aggregating \$3,829,000, had been voted up to March 1st and prospects for future road elections in various parts of the state, are exceedingly bright.

Great is Texas.

A NEW IDEA FROM THE WEST.

Governor Oswald West, the hustling young chief executive of Oregon, has come out of the west with an idea that is brand new to New Yorkers and word comes from Manhattan that the woman's department of the National Civic Federation, headed by some of Gotham's wealthiest women, is enthusiastic about it.

Governor West's scheme is to have the convicts in the New York state prisons manufacture brick for use on the highways of the state and Governor Glynn, who is just as much astonished over the idea as the good ladies are, hails it as a solution of nearly all of the ills that have afflicted New York's state highway commission. He is quoted as saying that by so using the convicts he will be able to "stop the grafting contractors from cheating the state and the grafting politicians from sand-bagging the contractors.

If the plan will work like that, in New York, the whole nation will hail it with delight, for New York's highway department has been a stench in the nostrils of the nation. The graft revelations that have been heralded luridly throughout the country during the past few years have hurt the cause of state aid in road-building more than anything else. Our people have been afraid to undertake big road-building projects for fear New York's methods might be copied elsewhere and huge sums squandered.

But there is nothing new about Governor West's "new" western plan. North Carolina's convicts have been making bricks for many years and a large part of the output has been sold to municipalities for paving purposes. Virginia, Georgia, South Carolina and other southern states have been doing the same thing for many years.

GEORGIA ROAD COMMISSIONERS TO MEET.

The first annual convention of the road commissioners of Georgia, which is to be held in Atlanta April 15 and 16, will bring together a fine body of practical road men from all parts of the state. The program, prepared by Dr. S. W. McCallie, state geologist, and his associates, is published elsewhere in this issue of Southern Good Roads.

We hope that the meeting will have the attendance that it deserves and that it will be successful in every respect. The papers that are to be presented, will be worth a great deal to every road official in the state and boards of county commissioners should see to it that their road officials are in attendance.

The question of better roads is one that affects both the fireside and the counting house.

The good roads problem is not only an economic one, but a moral and educational one as well.

Georgia Road Commissioners' Convention, April 15th and 16th

The first annual convention of the road commissioners of Georgia is to be held Wednesday and Thursday, April 15 and 16, in Atlanta. The convention's headquarters will be at the Kimball House.

A fine program has been prepared for this meeting. The people of Atlanta are arranging to entertain all delegates and visitors in the well-known "Atlanta way" and a delightful time is in prospect.

The program is as follows:

Wednesday, April 15th.

Official Registration by Delegates,

(Registration booth in main lobby of Kimball House.)

2:00 p. m.—Convention called to order. Address of welcome by James G. Woodward, Mayor of Atlanta; Response—Judge John W. Maddox, Rome, Ga.

2:30 p. m.—Election of temporary officers and proceed to organization; Appointment of Committee on Organization and Nomination of permanent officers.

3:30 p. m.—The Organization of a State Highway Department, Hon. W. S. Keller, State Highway Engineer of Alabama.

3:45 p. m.—Fifteen minutes for informal discussion and questions.

4:00 p. m.—Employment of Convict Labor in Road Construction—Hon. Joseph Hyde Pratt, State Geologist of North Carolina.

4:45 p. m.—Public Highways of Georgia, (Illustrated,) Dr. W. S. McCallie, State Geologist, of Georgia.

5:00 p. m.—Adjournment.

7:30 p. m.—Banquet at Hotel Ansley, complimentary to delegates and visiting officials.

8:00 p. m.—Good Roads as a State Asset, by Hon. John M. Slaton, Governor of Georgia.

8:45 p. m.—The Construction and Maintenance of Concrete Roads—Hon. Edward N. Hines, County Commissioner of Wayne county, (Detroit) Mich. (Illustrated with a number of views.)

9:45 p. m.—The 1914 American Road Congress—J. E. Pennybacker, Secretary, American Highway Association, Washington, D. C.

Thursday, April 16th.

9:00 a. m.—Convention called to order; Report of Committees on Organization and Nomination of officers; Election of permanent officers; Enrollment of Members, by Counties; New Business; Appointment of committee on Legislation.

10:00 a. m.—Economy of Permanent Roads, T. P. Branch, Professor of Engineering, Georgia School of Technology.

10:30 a. m.—Informal discussion.

10:45 a. m.—Uniformity in Accounting Methods for Counties—Joel Hunter, Chairman State Board of Examiners, C. P. A.

11:00 a. m.—Top Soil and Sand Clay Roads—Chas. M. Strahan, Professor of Civil Engineering, University of Georgia.

11:30 a. m.—Informal discussion.

12:30 p. m.—Moving Picture Views of Bituminous Macadam Roads in Construction.

1:00 p. m.—Buffet Luncheon, (Very informal,) in

old American Dining Room, Kimball House, for all delegates and visitors.

2:30 p. m.—Automobile tour of inspection of Fulton County Roads, machinery, equipment and convicts.

The Advantage of Connecting Highways.

Mr. J. C. Travilla, road engineer of Tarrant county, Texas, now engaged in supervising the expenditure of \$1,600,000 for good roads in Tarrant, stopped over in Temple, Texas, enroute to southern points in the state to make some good roads speeches, and while there gave the citizens of that city advice worth while. The Temple district of Bell county, has recently voted bonds for \$600,000 for roads and the problem of spending that sum wisely weighs heavily on the progressive citizens of that district. Mr. Travilla, according to the Temple Telegram, advised them to build at least four roads to the line of the district, connecting with the main roads of surrounding districts.

"In Tarrant county," he said, "there will be eight main roads leading from Fort Worth in several directions to the county line. These roads will enable travelers to journey for many miles without striking a mud hole. Our roads will connect with improved highways in surrounding counties as is the case from Fort Worth to Mineral Wells, a distance of over fifty miles. Between these two cities will stretch an improved highway traversing three counties, Tarrant, Parker and Palo Pinto. Also a road from Fort Worth connects with highways in adjoining counties and will be part of a system of improved thoroughfares extending from Fort Worth to Amarillo, a distance of over two hundred and fifty miles.

"This unbroken chain of roads would not be possible if our highways did not extend to the county line.

"Short roads running for a few miles into the country from an important city are very well for local trade but the great number of summer tourists who yearly journey overland from the North to the Gulf of Mexico will not attempt to travel over roads that are unjointed but on the contrary seek connecting highways from point of origin to destination. Every time a county or road district builds highways to its far border limit, it is just that much more towards a great international system of improved highways.

"In Montague county where Bowie is the county seat, roads were so built as to connect with highways in adjoining counties and as a result there are several thousand tourists passing through that county each year who prior to the building of the roads came south by way of east Texas."

Sullivan county, Tennessee, already possessed of many miles of good roads built by bond issues, has voted an additional issue of \$100,000 for roads.

Brooks county, Texas, will spend \$34,000 in road-building.

Precinct No. 1, Palo Pinto county, Texas, has voted bonds for \$700,000 for road building.

Fayette county, West Virginia, is contemplating an election on a bond issue of \$900,000 for roads.

OFFICERS

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C. B. Scott, Jr., V-Pres.
Waynesboro, Va.
F. D. Henley, Secretary
Richmond, Va.
C. S. Mullen, Treasurer
Petersburg, Va.

Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

EXECUTIVE COMMITTEE

Hon. G. P. Coleman
Richmond, Va.
Maj. E. H. Gibson
Culpepper, Va.
B. W. Hubbard
Forest Depot, Va.
C. . Scott
Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary



ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

Mr. F. D. Henley Secretary.

Mr. Wm. F. Cocke, president of the Virginia Road Builders' Association announces the appointment of F. D. Henley as secretary of the association to succeed Mr. W. I. Lee, resigned.

Mr. Henley is assistant engineer, in the employ of the Virginia State Highway Commission and is in close touch with road-building progress throughout the state. All communications may be addressed to him at Richmond, Va., care of the State Highway Commission.

* * *

Amherst County Does Well.

Amherst county wants to be in the front rank on the good roads movement in Virginia and it proves its want by its actions. The county has voted and issued road-improvement bonds to the amount of \$215,000. There has been made and completed approximately thirty-seven miles of improved macadam roads. The work is still in progress and will be continued until the fund is exhausted. It is contemplated that approximately thirty more miles of road will be constructed with the fund. In addition to the macadam road, numerous small concrete and iron bridges have been constructed on the roads.

* * *

Bristol to the Sea.

Owing to her natural geographical position, Virginia is to some extent the key state or the gateway through which the North and South tourist must needs travel. Fully 95% of the travel from the north and northeast passes through this state, and this travel is rapidly increasing with the years. The Old Dominion has attracted national attention because of the progress made in road building during the past six years or since the organization of the State Highway Department when Virginia convicts were put to work building good roads, until now there are about twenty-eight convict camps at work, and several additional camps will be put to work this year. More than \$6,000,000 worth of bonds have been voted by the counties and districts of Virginia during the last few years for improved road construction, and over half of this amount has been voted by the counties in the Ninth Congressional District.

Three Interstate Highways.

That Virginia is alive to the opportunity is shown by her activity in improved road construction, and particularly in the efforts being successfully made to build intercounty and interstate highways. At least three

great interstate highways are now under construction which affect the entire state, while others of perhaps equal importance are being constructed which affect certain sections of the state. The Capital Highway, extending from Washington to Richmond and crossing the state line south of Emporia, is well under way and will be completed in a few years; it is already one of the most traveled roads in the United States.

Washington-Lynchburg-Danville.

The highway from Washington, via Warrenton, Charlottesville, Lynchburg and Danville and the South, is progressing nicely, and construction work is going forward at various points along the route. The Bristol-to-Washington Highway, organized two years ago has gone forward by leaps and bounds, and every county in southwest Virginia through which it passes is engaged in constructing same, except Montgomery, and those interested are looking for something to be doing in Montgomery soon. While the Bristol-Washington Highway has not been located north of Roanoke, it has been practically decided by its promoters to locate this road from Roanoke up the Valley, and cross the Blue Ridge for Washington at Staunton, New Market or Winchester, the final location from one of these points to Washington depending, to a large extent, upon the interest and activity of parties interested in each route. Construction work is going ahead in Rockbridge and Augusta counties.

From Bristol, Tenn. to Norfolk, Va.

Just glance at the map of Virginia and it will be at once that a state highway from Bristol to the Sea is sorely needed and that it can be made to connect several important cities.

* * *

Washington-Atlanta Highway.

A meeting in the interest of the proposed Washington-Atlanta highway was held at Petersburg, in the Chamber of Commerce building, March 17, and there were present J. E. Pennybacker, secretary of the American Highway Association; P. St. Julien Wilson, assistant director of the United States Office of Public Roads; Leonard Tufts, chairman of the maintenance committee, American Highway Association; George P. Coleman, State Highway Commissioner; Dr. Joseph H. Pratt, State Geologist of North Carolina; Preston Belvin, of Richmond; Colonel Benehan Cameron, of North Carolina; W. C. Spoon and D. E. Winslow, of the United States Office of Public Roads, and representatives of the road boards of Chesterfield and Dinwiddie counties. It was explained that the American Highway

Association and the United States Office of Public Roads propose to co-operate with the officials of the counties through which the highway is built in the maintenance of the road, the government and highway association to place engineers in charge of the work. This plan was fully explained and discussed. The first step is to make a tour of the roads from Rich-

mond to Atlanta, and to hold conferences with the county officials and leading citizens along the route, to make necessary arrangements for putting the maintenance scheme into effect. The meeting was a very pleasant and business-like one. The visitors left for Lawrenceville on their way through North Carolina to Atlanta.

The Road Situation in Virginia

By HON. G. P. COLEMAN

State Highway Commissioner, Richmond, Va.

A MOVE for the construction of hard surface roads started nearly two thousand years ago with the construction by the Romans of roads for military purposes, but the scientific and economic construction of this class of road was not generally adopted until the advent of John Macadam in the early part of the last century.

Macadam, a Scotchman by birth, was the first to realize that drainage was the all-important factor, and that a road with well drained foundation or sub-grade required very much less surfacing material, and could consequently be constructed for a very much lower cost. He also argued, rightly, that ordinary earth, when properly drained and kept dry, would carry any weight of traffic to which it might be subjected. You will gather from this, then, that his first work was to see that his road-bed was properly drained, and then to keep this road-bed dry at all seasons of the year. With this end in view, he constructed cross drains and side ditches to take off the water, and placed a stone surface or roof over this road, that is, he placed the stone on the road-bed in such manner as to make it impervious to water, and in this way constructed the road which has since borne his name. The stone for the roads in his time was hand-broken and the binding of the road depended largely on traffic for the fine material necessary to cement the stone properly.

The modern stone crusher was not invented until 1858, when one Ely Blake, of Connecticut, conceived the idea of breaking stone other than by hand, and he got his first patent at that time. It might be interesting to note that Blake crushers are now in use and are being manufactured by the Power Mining and Machinery Company. The first and nearest approach to the modern steam roller was built by the Aveling and Porter people of England, in 1863, and I am satisfied that this first roller is doing good work right now here in Virginia.

With the invention of these wonderful pieces of road machinery road construction was revolutionized and simplified. The first systematic highway work of any importance in the United States was done by the Massachusetts Highway Department, and the movement has gradually spread from Massachusetts throughout the country, and at the present time thirty-five states have highway commissions to aid their citizens in the proper construction of their roads.

Following this lead, the Honorable Charles Lassiter, of Petersburg, and Honorable Robert Withers, of Suffolk, introduced in the 1906 session of the legislature of Virginia, a law creating the highway commission and the convict road force. To these two gentlemen is largely due the credit for the present road movement in this state. Under this first law the department was authorized to give such advice and assistance as was possible to counties applying for convict labor. In the

years 1906-1907, very little actual road work was done, but a great many road meetings were held in the different sections of the state and the counties urged to take advantage of the state's offer of assistance in the construction of their highways.

By the beginning of 1908, this movement had taken such shape that the legislature of that year realized that the convict labor which the state was able to furnish, could not meet the demands. They therefore passed the state money aid law, which gives to all of those counties not using convicts, money aid in the construction of their highways. The legislature of 1912, further realizing the necessity for an increased appropriation to the road movement, passed the automobile law, distributing the tax received from automobiles in the same manner in which the legislature of 1908 had distributed the state money aid. The following table shows the mileage and cost of construction from 1906 to 1913:

| Year. | Miles. | Cost. |
|--------|--------|--------------|
| 1906-7 | 24.00 | \$ 9,677.70 |
| 1908 | 51.80 | 172,070.86 |
| 1909 | 137.58 | 435,259.76 |
| 1910 | 290.07 | 801,623.29 |
| 1911 | 395.86 | 916,925.40 |
| 1912 | 542.85 | 1,653,848.85 |
| 1913 | 619.33 | 1,487,782.35 |

During the same time we have constructed a number of bridges, varying in length from 20 feet up to 1100 feet, costing \$357,262.00. This gives you in general the work which has been done by this department since its formation. To summarize, this department has constructed since its formation, 2,068.24 miles of road costing \$5,723,583. We have also constructed 135 bridges, costing \$357,262. During the last year we constructed in the state of Virginia, 619 miles of road and 83 bridges at a cost of approximately \$1,500,000. During the past year we worked on 355 different roads and 83 bridges, and at one time during the year we had between 150 and 160 different pieces of work under construction. You will see from this that with the force at our command it was impossible to always supervise the work as carefully as should be. We hope, however, with the increased appropriation asked for to be able to give prompter and more careful supervision, and in this way save to both the state and counties, many thousands of dollars. Up to May 1, 1913, we had in operation seventeen convict camps. Since that time we have established eleven more, making a total of twenty-eight convict camps scattered throughout the state. Of these, twenty-five are supported and maintained by state appropriation and three of them are maintained by the counties, with the understanding that if the present legislature makes a sufficient appropriation they will be taken over and maintained at

the state's expense. We have now on file applications for four additional camps which we hope to place in the field during the course of the coming year.

It has been interesting to note from year to year the tendency on the part of the citizens and the counties to connect up short sections of road already constructed. This will ultimately lead to a great many through roads. I think I can say with some assurance that in the course of the next few years, you will be able to go from Graham, in Tazewell county, through the counties of Tazewell, Russell, Wise and Lee to Cumberland Gap, Tennessee. Then there are several proposed connections from this road through the counties of Scott and Russell to connect with the road from Bristol to Roanoke. At the present time we are working on this road, that is, the Bristol-Roanoke road in Washington county, between Bristol and Abingdon; in Smythe county between Marion and the Wythe county line; in Pulaski county between Pulaski and Dublin; in Roanoke county between Roanoke and Salem. A great deal of work has been done in Wythe county, but only a short section has been constructed in Montgomery, but arrangements are being made to start this work in the near future. Some work is now being done in Botetourt county and in Augusta county on the proposed connection from Roanoke via Fincastle and Lexington to the Augusta county line, to connect there with the road which is being constructed by Augusta county to the town of Staunton. This road will connect with the old Valley Turnpike, which gives us a road through to Hagerstown, Maryland. The road from Staunton to Charlottesville is well under way, but nothing has been done north of Charlottesville towards the Orange county line, but a great deal of work has been done in the counties of Orange, Culpeper and Fauquier, leaving the section of road through Prince William and Fairfax to be constructed on the road via Charlottesville to Washington. I have been informed that plans are under way for the construction of this section. The road from Washington via Fredericksburg to Richmond is well under way and we feel assured that we will have this completed by this time next year. A road has already been constructed from Richmond south through Petersburg, Dinwiddie, Lawrenceville, Boydton and Clarksville to the North Carolina line, and in addition to this, the road from Lawrenceville to Emporia and thence to the North Carolina line. A road has also been constructed from Petersburg through Dinwiddie and Nottoway to the Prince Edward county line, but no move has been made up to the present time to construct a road through Prince Edward, Appomattox and Campbell counties to Lynchburg, but we hope that a move with this end in view will soon be started. Bedford county has just signified its intention of starting on the connecting link in the road from Lynchburg to Roanoke. A great deal of work has been done through the counties of Charles City, New Kent, James City, Warwick and Elizabeth City to Old Point. This road with a very small expenditure of money can be put in excellent condition and can be maintained at a very small per mile cost. I have recently made a trip via Suffolk, Franklin, Courtland up to Petersburg with a party of automobilists who are interested in obtaining a through road from Norfolk and Virginia Beach to Richmond, to connect at various points with the roads already constructed, which would give them an out-let to the south, and to the west. You will see from the foregoing that within a few years Virginia will be in possession of a system of improved roads which will make a very creditable showing when compared with our resources.

The money used in the construction of these roads

has been raised by state appropriations amounting to approximately \$1,033,000. The remainder has been raised from county and district bond issues and direct county funds. The county bond issues during the past seven years have amounted to \$6,364,000, and of this amount \$1,306,000 was voted during the past fiscal year. Right here I wish to sound a note of warning to those interested in road construction, and to impress on all of you the importance of the maintenance of these roads after they have been constructed. Too much stress cannot be laid on this important question, since, in my judgment, it is almost criminal for a county or district or community to construct roads of any class and then make no provision for their up-keep and maintenance. I should like to see the laws so amended as to compel counties on issuing bonds, or accepting convict labor or state money aid, to make proper provision and formulate definite plans for the permanent up-keep and maintenance of the roads which have been and are to be constructed, for only in this way can we obtain a lasting benefit from the money which we have expended and are expending.

Along this line I will say that during the last few weeks, several bills have been presented to the legislature. One of these requires that a county, or district, on issuing bonds, shall be required through the proper authorities to lay a levy of not less than three per cent of the amount of bonds issued for the maintenance and up-keep of the roads after they have been constructed. Another of these bills places it in the power of the commission to withdraw convict labor or money aid from a county which refuses to maintain the roads which have already been constructed within its borders. A third of these is a law which distributes the automobile tax to the counties under the same conditions under which they are now receiving state money aid, to be used in the maintenance of the roads already constructed, all of this work to be done under the direct supervision of the highway department.

We are asking the present legislature for a state money aid appropriation of \$200,000 and an appropriation of \$145,000 to be used in the maintenance of the convict camps. In addition to this, we are asking them for \$27,500 for the maintenance of this department, and as stated above, we are asking for an amendment to the automobile law placing the funds from this source, amounting to approximately \$90,000, on the maintenance of the roads already constructed and being constructed, this fund to be distributed to all of the counties in which road work has been done under the supervision of this department.

Prizes for Highway Study.

To encourage investigation of methods and materials for road and street construction, and to interest engineering students in highway problems, the Barber Asphalt Paving Company has offered prizes of \$100 for the best paper written by a member of the graduating classes of the leading engineering schools.

The title suggested is "Asphaltic Materials for Highway Construction." The paper and its conclusions may be based upon service tests and the lessons of experience; the physical qualities or chemistry of asphalt; or it may combine any two of these lines of investigation. The length of the paper is limited to 3,000 words and all manuscripts must be received not later than June 1, 1914.

The purpose of this prize offer is to turn the attention of engineering students to street and road construction as a field of work in which there is great need and great opportunity for trained men.

North Carolina Good Roads Association

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Chapel Hill, N. C.
Miss H. M. Berry, Asst. Secretary
Chapel Hill, N. C.
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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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Good Roads Institute.

There was held at the State University, Chapel Hill, N. C., March 17-18-19, under the auspices of the Highway Engineering Department of the State University and the North Carolina Geological and Economic Survey, a road institute for the benefit of the road engineers and superintendents of the state, and any others who desired to come. It was very well attended, there being present men from 22 different counties, from Madison on the west to New Hanover on the east. There were in attendance 45 men outside of Chapel Hill, and all of the students of the University who are taking road engineering courses were in attendance. Questions vital to the road engineer and superintendents of North Carolina were taken up in papers by expert engineers and free discussions were indulged in by all those present; so that many questions of great importance were threshed out and some definite conclusions reached, which will undoubtedly be of great benefit to the road engineer and superintendent on his return to his work.

The following subjects were discussed:

"Road Location," the first and most important step in road building. The various steps in road location were discussed in talks and papers by Professor William Cain, head of the Department of Mathematics of the University, Mr. D. Tucker Brown, road organizer and field engineer of the North Carolina Good Roads Association, and Professor T. F. Hickerson of the Engineering Department of the University.

Professor Hickerson also demonstrated the use of the Abney Hand Level, and has written a paper on this which will be published and distributed by the geological survey among all the road engineers and superintendents of the state.

A very strong and excellent paper was read by Mr. W. S. Fallis on "Economics of Road Construction."

Sand-clay, topsoil, gravel, and dirt roads were discussed by Dr. Pratt. Waterbound and bituminous macadam roads were discussed in an illustrated lecture by Mr. C. S. Reeve of the United States Office of Public Roads. Drainage of roads was taken by Professor Hickerson. A most excellent paper on "County Bridges" was read by Mr. John N. Ambler, of Winston-Salem. Culverts were discussed in detail by Mr. R. T. Brown, Road Engineer of Orange county, who also gave a demonstration of the Road Drag. Mr. N. C. Hughes, road engineer of Halifax county, took up the question of road building machinery. Professor Collier Cobb of the geological department of the university gave an interesting talk on road surfacing materials,

which was supplemented by Mr. John E. Smith, assistant in geology. Mr. J. S. Moore of the Robeson Process Company, gave an interesting talk on the use of binders in road construction, particularly those manufactured by his company. "Maintenance of Roads" was discussed by Mr. R. A. Burnett, road engineer of New Hanover county, who has inaugurated a very efficient system of maintenance in that county.

Professor M. H. Stacy, Dean of the University, spoke on "Organization of Road Forces." On the afternoon of March 17th, Mr. J. S. Miller of the Barber Asphalt Paving Company gave an illustrated lecture with moving pictures on "Asphalt from its source to the pavement," and on the evening of March 18th, Professor Collier Cobb gave a series of lantern slides showing good roads in foreign lands, which was most attractive.

It was the sentiment of those who attended this institute that it was a marked success, and very strong resolutions were passed asking that it be made a permanent institute. The inadequate and out-of-date methods used in the greater part of our state as far as road building is concerned can undoubtedly be improved by thus bringing together those who are engaged in road construction in the state and showing them better ways of locating and building roads.

* * *

ORGANIZATION NOTES FOR MARCH, 1914.

Alamance County.

Mr. W. S. Crawford, Mayor of Mebane, requested Dr. Pratt to send an engineer to investigate and make survey of the link in Central Highway from Orange county line at Mebane to Haw River. Mr. Brown was sent to Mebane, but was unable to make the necessary surveys on account of weather conditions. Much enthusiasm was aroused, however, in the interest of the North Carolina Good Roads Association with the result that there will soon be formed at Mebane, a local division of the North Carolina Good Roads Association.

Mr. W. S. Crawford rendered Mr. Brown valuable assistance in his work there.

Granville County.

Mr. Brown also visited Granville county and held a meeting at Oxford under the auspices of the Granville Commercial Club. A great many of the citizens, under the leadership of their progressive county school superintendent, Mr. J. F. Webb, were just organizing a Granville County Good Roads Association. After Mr. Brown had outlined fully the objects of the North Carolina Good Roads Association, and they had been discerned by local good roads men, the local association,

through its representatives present, decided to affiliate with the state association.

With one at the wheel of such energy and enthusiasm as Mr. Webb, we may look for good work in Granville county.

The commission of Warrenton township who have \$50,000 for good roads, have secured the services of Mr. S. D. Scott, formerly of the Virginia State Highway Commission. Mr. Scott will begin work immediately, making surveys for the roads which are to be built. It is proposed that Mr. Brown make occasional visits to Warrenton whenever his services may be needed.

Madison County.

Mr. Brown spent some time in March at Marshall, Hot Springs, Barnard and Rnnion. The object of his trip was to investigate the three proposed routes for the Central Highway through Madison, and make a report to Dr. Pratt on the practicability of each.

* * *

Beaver Island township of Stokes county will vote on April 11th on a bond issue for \$25,000 for building good roads.

* * *

The contract for the new iron bridge between Forsyth and Davie counties has been awarded, the price being \$31,000.

* * *

The State Geologist appeared before the county commissioners of Durham county on March 3rd and discussed with them the maintenance of the Durham county roads.

* * *

A plan is on foot to select a route for the Central Highway through Forsyth, Davie, and Iredell counties. The road would run 26 miles through Forsyth, 27 miles through Davie, and 26 miles through Iredell.

* * *

Sauratown township of Stokes county has sold \$50,000 worth of road bonds.

A Letter From Hon. Logan Waller Page.

Under date of March 11, 1914, Mr. Logan Waller Page, president of the American Highway Association, has addressed the following letter to Mr. E. L. Powers, Secretary American Road Builders Association, 150 Nassau Street, New York City:

It has come to my notice in a press article sent out from the publicity bureau of the American Road Builders Association under date of March 3, that the following statement was made:

"At the 8th annual convention held at Rochester in November 1911, the association initiated a movement looking toward a single annual convention to be participated in by such associations as the A. R. B. A., the American Highway Association, the American Automobile Association, and the Association of Manufacturers of Road Machinery and material. The committee appointed succeeded in getting a meeting of the representatives of the different associations present at the Richmond convention of the American Highway Association. *****"

I wish you would kindly send me copy of the minutes covering such action at the Rochester meeting and the names of the members of the committee which was appointed. This is the first information I have had that any such action was taken at Rochester and I am at a loss to understand how the National Association of Road Machinery and Material Manufacturers could have been given consideration in the proceedings at

Rochester, as the said association was not formed until the following week, at Richmond, during the sessions of the American Road Congress. The steps taken at Richmond looking to the holding of a joint congress were at the instigation of the American Highway Association, to the best of my knowledge and belief, and I believe that this impression was quite general on the part of all who participated in the conference at that meeting.

In the same press article, to which I have referred, the statement is made that the committee, appointed in accordance with the resolution adopted at the Philadelphia meeting, immediately took steps looking to the holding of a joint congress. Our records show that immediately following the Philadelphia meeting, I wrote Mr. Samuel Hill, President of the Road Builders Association, stating the desire of the American Highway Association to do everything possible to bring about the holding of the joint congress. To this letter no reply was ever received, and a few weeks later Mr. Pennybacker, secretary of the American Highway Association, wired you for names of the road builders committee. Under authority of our executive committee, I appointed a committee to confer with your committee, and, as you know, a joint meeting was held at the Hotel Belmont, New York, on January 21. It is a matter of record that your committee stated that it had no power to act on the question of a joint congress and that it could only report to the annual meeting of the Road Builders Association, on February 6, without even making a recommendation on the question of holding a joint congress. You will recall further that, at the conference, our committee stated that, although Atlanta had been chosen as a meeting place for the American Road Congress, our association was willing to leave the selection of date to the American Road Builders, to allow them to name the president of the congress, to place the whole management in the hands of a committee on which each would have equal representation, and, in short, to make every reasonable concession, except to change the place of the meeting. I called attention to the fact that national meetings have been held in the East, Middle West and the Northwest, and that the far West would undoubtedly receive consideration in 1915, and, therefore, that the south was logically entitled to the 1914 congress. At the road congress held in Detroit, fully two-thirds of the exhibitors signed a petition requesting the selection of Atlanta and we have since received letters from nearly all of the important manufacturers of road machinery and material recommending the selection of Atlanta. Mr. Pennybacker and I attended the annual meeting of the road builders association on February 6, at which meeting it was decided that the association had not the power to select the time and place for the annual convention. Thus a second time the matter was thrown out on a technicality and, all the while, we were at much inconvenience holding open the selection of a date for the congress in Atlanta.

Finally, at a meeting of the Board of Directors of the American Road Builders Association held in New York on February 27, at which I was present, the board held that it had no power to act as decision rested with the executive committee. I insisted that the matter be brought to an issue and, as the executive committee was present, the members waived their rights in the matter and the board of directors voted against the holding of a joint congress.

I am not writing in any spirit of animosity, but I feel, in order to avoid any misunderstanding in the future, it is desirable we should have an accurate record of the various steps taken.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Arkansas.

County Judge C. M. Philpot, of Pine Bluff, Arkansas, president of the Arkansas Good Roads and Drainage association, has appointed committees as follows:

Executive Committee—Harry E. Cook of Lake Village, chairman; W. A. Falconer of Fort Smith, J. P. Benton of Fordyce; George R. Kelly of Benton, E. P. Moliter of Helena, C. B. Coe of Newport and H. C. Smith of Bentonville.

Legislative Committee—Judge Joe Asher of Little Rock, chairman; Ad Bertig of Paragould, E. R. Screenton of DeVall's Bluff, Dr. E. D. McKnight of Brinkley, Dr. J. O. Bush of Forrest City, B. F. Cole of Harrisburg, Hamp Williams of Hot Springs, S. Q. Sevier of Camden, J. D. Milner, of Pine Bluff, W. H. Harvey of Star City, A. J. Walls of Lonoke and E. J. Hahn of Little Rock.

Finance Committee—W. W. Dickinson of Little Rock, chairman; W. M. Kavanaugh of Little Rock, C. H. Trippett of Pine Bluff, W. A. Coker of Monticello, H. L. Remmel of Little Rock, Ezra Hester of Fort Smith and R. H. Stearns of Pine Bluff.

County Judge E. P. Moliter of Helena, is vice president of the state association, and George B. Brown of Little Rock is secretary-treasurer.

* * *

California.

Los Angeles has the proud record of surpassing every California county in the number of miles of improved roads possessed. San Joaquin county ranks next to it.

Right now Los Angeles county has within a few hundred feet of 400 miles of improved highways, completed and under way. It has 298 miles of improved road completed and accepted, constructed from the bond issue funds. There are about fifty miles of highway improved under the district plan, and about an equal amount of mileage that is now under contract. San Joaquin county boasts 240 miles of improved roads.

More than 700 men are employed on the Los Angeles county highways. Two classes of construction are used, the macadam and the concrete road. The county now has three concrete highways. Some of the new districts will demand this class of construction.

Discussing the various forms of road construction and the unfailing item of road maintenance recently, Chief Engineer Joyner said, regarding the wear and tear on highways by automobiles:

"No man can show that the autos are doing any more harm to the highways than other classes of travel such as heavy teaming. I do not believe they do as much harm, for the autos help to keep alive the asphaltic oil through the constant slight movement of the surface.

"The big item of maintenance is that of caring for the storm waters, and we shall have that problem, whether the highways are of macadam or of concrete.

"As to the great demand for extensions of the county good roads system, it appears to me that it is only good business for the county to give its substantial aid when a neighborhood is willing to put into the project several thousand dollars. The county in the long run will find that it is a good investment to have furnished

the oil and rock for highways where the balance of the costs are paid by the road improvement districts.

"The extent of the demand has caused surprise, but I know of several more prospective districts of which I am not at liberty to speak at present, and I believe that the expansion of Los Angeles county's good roads system in 1914 will be a remarkable one."

* * *
Georgia.

Georgia is alive to the good roads movement and the importance of this work is being stressed by the Georgia Chamber of Commerce. While wonderful improvement has been made during the past ten years and the value of good roads has been fully demonstrated, the work is still in its infancy, and in most of the Georgia counties where good roads work has been done, the results have given the people an appetite for still better roads.

Emory Winship, of Macon, chairman of the good roads committee of the Georgia Chamber of Commerce, and a selected party in his two automobiles, will tour the state at an early date to interview the county commissioners on the subject of a state highway commission, the object of which will be to regulate the working of the roads in all of the counties and to improve conditions in all of them. There is room for improvement in the roads of every county in Georgia and all counties have plenty of good roads building material, so that the cost of better roads would not be a great amount.

Detailed plans for the trip have not yet been completed, but Chairman Winship stated recently that this course would probably be the first important step taken looking toward getting the highway bill before the legislature at its next session.

It is proposed for Chairman Winship and committeemen who accompany him to confer with the ordinaries, county commissioners and every other public official to get facts and discuss ways and means of arousing public sentiment in favor of good roads.

Officials of the state chamber are sending out circulars over the state urging co-operation with the Good Roads Committee. Among other things, the circular says:

"The opinion of the people visited, made public through the press, is to be crystalized into state-wide highway laws whereby the united efforts of the people in each county will be obtained and the building of good roads under a thorough and uniform system insured.

"The agitation and publicity growing out of this personal touch with the people and the public meetings which will be called are part of the good roads campaign and will, we believe, prove the beginning of a great revival in highway construction.

"As you will readily understand, it will require a very vigorous campaign of education to bring some of our counties to a due appreciation of the value to the public of good roads.

"This feature of the campaign, together with all the work incident to it, is very expensive. The Georgia Chamber of Commerce is appealing to the patriotic cit-

izens of Georgia each to do a small part to further the undertaking."

One of the aims of the committee in charge of the good roads campaign is to have a bill passed by the legislature next summer, providing for a State Highway Commission. A report of this work will be made to the American Good Roads Congress that meets in Atlanta in annual session during the week beginning November 9.

It is hoped by the management of the roads congress that one of the results of the meeting in the south will be the establishment of state highway departments in the six southern states which have failed thus far to adopt the plan of state supervision, namely Georgia, South Carolina, Florida, Tennessee, Mississippi and Texas.

* * *

Illinois.

An appeal to teachers in the public schools and to all women's clubs as well as agricultural associations and highway officials to make "road day," April 15, a success, is contained in a proclamation issued by Gov. Dunne, of Illinois. Gov. Dunne urges that the day be made the starting point for a year of unprecedented road improvement in Illinois.

The proclamation urges the state highway commission, the state highway engineers, county superintendents of highways and other highway officials to begin practical and effective work upon improvement of public roads.

The proclamation says in part:

"It is important that the local highway commissioners, the county superintendents of highways, the good roads organizations and commercial clubs in their respective communities unite in the adoption of a plan to organize and carry out this work, so as to give the greatest number of citizens an opportunity to celebrate the observance of road days by practical work on the roads, such as road dragging, grading, draining, hauling and placing gravel, stone or other road material.

"I have requested the state highway commission to suggest what class of work may be entered into advantageously."

Co-operation is urged to begin practical and effective work upon the improvement of highways, to continue said work industriously, and "pull Illinois out of the mud," which has so grievously clogged her rural transportation in the past.

* * *

Michigan.

The Michigan highway department, under the direction of Commissioner Frank Rogers, is making plans for improving the roads in the state during the ensuing year, and within a few weeks active work on the highway will begin.

In regard to funds to carry on the road building this year, Commissioner Rogers says that over \$200,000 will be carried forward in balances in the ordinary state reward fund and that there will be \$100,000 in the trunk line fund. The balances are to carry the department only to July 1, when the motor vehicle fund, estimated at \$750,000 this year, is expected to pay the rewards. At that time the trunk line appropriation, amounting to \$300,000 becomes available and it is expected to care for the trunk lines for the year.

"The last legislature made some progressive changes in the highway law which have added greatly to the efficiency of the state highway department," said Commissioner Rogers. "I expect that several hundred miles of reward roads will be built during the

coming summer, as there appears to be a general awakening to the fact that good roads will lower the cost of marketing and in this manner cut down the cost of food products to the consumers."

Since the first good roads law was enacted in Michigan in 1905, 2,244 miles of state reward roads have been constructed in the state. The average state reward per mile has been \$664.

State Highway Commissioner Rogers reports that there are a total of 2,244 miles of state reward roads in Michigan. At the close of the fiscal year, June 30, 1913, 1,754 miles of roads had been built on which \$1,164,572 of state reward money had been paid, or an average reward of \$664 a mile.

The state official in discussing the new highway laws enacted by the last legislature says that the progressive changes have added greatly to the work of the state highway department.

"Michigan's state reward law was originally enacted by the legislature of 1905 and became operative July 1 of that year," said Commissioner Rogers. "Only \$20,000 was available for rewards the first year, but there were not enough roads built to take the money. The results in the first eight years to July 1, 1913, however have been quite gratifying, and the results since that date show no falling off in the mileage of roads built.

"At the close of the fiscal year, June 30, 1913, 1,754 miles of roads had been built on which \$1,164,572 of state reward money had been paid. This was an average reward of \$664 a mile. The cost of the state's administration for this period was about seven per cent of the total rewards paid and less than one and one-third per cent of the total cost of the roads built. In this connection it might be noted that departmental expenses for the past fiscal year were only four and three-fifths per cent of the rewards paid.

"Between July 1, 1913 and Dec. 1, 1913, the last date on which our books were balanced, there had been built 383 miles of ordinary reward roads and 22 miles of trunk line roads. Since December 1, 79 miles of ordinary roads have been accepted and six miles of trunk line roads making a grand total of 2,244 miles of state reward roads in Michigan on January 1, 1914. Owing to the shortage of funds in the state treasury ordinary rewards were paid on only 286 miles and on seven miles of trunk line roads; the remaining roads will receive their state bounty as early in 1914 as state funds are available."

* * *

Missouri.

According to the St. Louis Post-Dispatch, a good roads meeting held at Washington, Missouri, on March 4, was claimed to be the best attended ever held in Missouri. The purpose of the meeting was to arouse enthusiasm for the road from St. Louis to Jefferson City.

J. H. Dickbrader, highway commissioner for Franklin county, who is very enthusiastic over the planned route, says that it will be put in excellent condition for use by the first part of the summer of 1914 and that thereafter work on it will be continuous until it becomes the best road in Missouri. It is one link of the proposed south highway from St. Louis to Kansas City.

State Highway Commissioner F. W. Buffum of Louisiana attended the meeting and every highway overseer in Franklin county was also there. The merchants of Union and Washington have raised \$1600 and the farmers along the line \$2500 to complete the section of road from Union to New Haven.

New York.

In his annual report to the state legislature, Mr. John M. Carlisle, commissioner of highways of the state of New York, comes out strong for working convicts on the roads. He says:

"In my opinion the time is now ripe when legislation should be passed permitting the utilization of some of our convicts in the construction of state and county highways. Under the provisions of the prison law they can now only be utilized in aid of town highways and within thirty miles of a state's prison, and during the last year good results have been procured in the utilization of convict labor in this direction.

"I have carefully watched this problem and am satisfied that it can be extended to state and county highways and legislation has been submitted to the legislature along these lines. It can never be anticipated that we can build anywhere near the mileage required by the use of this labor, but there are certain sections of the state and certain roads upon which we could use them at a very large saving to the state. The scenic road around Storm King, on the Hudson river; the Catskill Mountain road and some of the roads in the Adirondack Mountains are peculiarly located for the use of this kind of labor. The convicts could be employed upon these roads away from the habitations of the people, under close restraint, and this state ought to commence to try to solve the problem and see with what success the labor of convicts can be utilized."

Under the present system, only 12,000 miles, practically one eighth of the local mileage of roads, can be completed. Mr. Carlisle will recommend that the legislature shall make it possible to extend the mileage of the county roads by adopting a cheaper construction than that employed on the state highways.

During the last year approximately 1,000 additional miles of state and county highways were completed, making the present total about 5,000 miles. A bill already has been introduced in the legislature at the department's request asking for an appropriation of \$10,000,000 of which \$500,000 would become available at once, the remainder on October 1st. This is the second large dip into the second \$50,000,000 appropriation. The sum of \$5,000,000 from this fund was made available by the legislature of 1913, but only \$1,369,205 of it is involved in existing contracts, the unobligated balance being \$3,630,750.

Mr. Carlisle thinks the present method of distributing the county road fund inequitable.

"If these roads continue to cost the state \$13,000 per mile," he said, "there will be a deficit of moneys necessary to build the county highways of \$25,000,000.

* * *

Ohio.

Ohio will expend \$7,000,000 for good roads this year. This will exceed all the money it has put into good roads since the enactment of the state aid law for this purpose some eight or more years ago.

Beginning this year, Ohio will step into the forefront of states in road construction. The new Hite law making a half mill levy on the grand duplicate of the state is largely responsible for this.

Highway Commission Marker estimates that between \$4,000,000 and \$5,000,000 will be raised by this and other laws by the state. Added to this will be something like \$3,000,000 which will be raised by the counties, all of which will be for good roads.

Eighty-five counties have petitioned the state highway department for a total of more than 7,000 improved highways. Sixty-one of the counties have gone the limit, having asked for all they can get under the road

building act. The remaining 24 counties that have application in, asked for nearly everything allowable.

Commissioner Marker says that the department will be kept busy for several years building the improved highways petitioned for. The sentiment in favor of good roads is strong everywhere in the state and the ultimate effect of this, sooner or later, will find its fruition in the construction of a complete chain of main and intercounty market roads that will not be surpassed by any other state in the country.

It is announced from Massilon, Ohio, that the redoubtable General Jacob S. Coxey, though twice denied access to President Woodrow Wilson, is planning another "ocular demonstration" like his famous march of the unemployed in 1894. He is doing it in furtherance of a plan "to put an end to panics forever."

"By May 1," says Coxey, "I hope to marshal a million migratory workers in Washington. Our object will be the same as that of twenty years ago, to persuade the government to issue currency secured by the non-interest bearing debt of the states and get the states to spend it in paying every rural road in America. This would steady the labor market by absorbing the excess labor and would bring tremendous increase of prosperity through improved transportation.

"In Ohio, we have 8,000 miles of paved road, but we also have 80,000 miles absolutely unpaved. The plan that I propose would put an eighteen-foot brick pavement on every foot of Ohio road in twenty years.

"The trouble is that we have farmed out the money privilege to a favored class. Money, transportation and communication are government function and should be administered without private profit."

* * *
* * *

Texas.

According to the March bulletin of the Texas Business Men's Association, road and bridge bonds aggregating \$2,629,000 were issued in the state during February. Compared with bonds voted for highway improvements during January, this is an increase of \$1,429,000, and also a gain of \$1,529,000 over February of last year. During the month nineteen road and bridge bond elections were held and fourteen of them resulted in victories, while four were lost by a small vote. The date, amount, result, and the precincts and counties in which the February good roads bond elections were held are as follows: Brooks, entire county, 14th, \$34,000, carried; Bastrop, Elgin Precinct, 17th, \$30,000, carried; Collin, Princeton Precinct, 21st, \$100,000, carried; Collin, Farmersville Precinct, 21st, \$200,000, carried; Collin, Culleoka Precinct, 21st, \$65,000, carried; Collin, Celina Precinct, 21st, \$125,000, carried; Collin, Prosper Precinct, 21st, \$100,000, defeated; Coryell, Road District, 14th, \$75,000, defeated; Garza, entire county, 21st, \$50,000, carried; Harrison, Marshall Precinct, 24th, \$300,000, carried; Hays, Kyle Precinct, 14th, \$50,000, carried; Hill, Itasca Precinct, 21st, \$150,000, carried; Limestone, Groesbeck Precinct, 21st, \$150,000, defeated; McLennan, Justice Precincts 1 and 3, including Waco, 14th, \$1,075,000, carried; Milam, Thorndale Precinct, 21st, \$100,000, carried; Palo Pinto, Mineral Wells Precinct, 17th, \$100,000, carried; Red River, Clarksville Precinct, 21st, \$200,000, defeated; Kaufman, Forney Precinct, 24th, \$250,000, carried; Kaufman, Terrell Precinct, 24th, \$300,000, defeated.

During the two months of this year road and bridge bonds in the sum of \$3,829,000 have been authorized in Texas. This is an increase over January and February of 1913 of \$2,729,000. This enormous increase is attributed largely to the vigorous campaigns waged for

better roads by the Good Roads Association of Texas and other commercial organizations, which has permeated practically every county in the state with the good roads spirit.

Two elections were recalled during the month, one in Denton Precinct of Denton county for \$300,000. The reason this election was called off was stated in a petition filed with the commissioners court of that county, saying that the boundaries of the district were not satisfactorily arranged. Another petition setting aside a new district will be presented later. Cooke county citizens filed a petition recalling a \$700,000 issue, giving as a reason that a large number of farmers of the county seemed to be opposed to further taxation.

McLennan county bears the distinction of issuing the largest amount for highway improvements during the month, having voted bonds to the amount of \$1,075,000. It is also the largest issue of 1914 and is only exceeded by the \$1,600,000 bond issue of Tarrant county in 1912. The elections were held in Justice Precincts 1 and 3, comprising 300 square miles including the city of Waco. The bonds received a big majority and the victory is attributed principally to the unswerving support accorded the project by Waco business men and farmers. The ministers of Waco also heralded the need of more and better highways from their pulpits each Sunday. The commercial organizations of that place were also ardent supporters of the issue.

Collin county was the center of good roads agitation during February and five highway bond elections were conducted in as many different precincts. Four of the elections carried aggregating a total of \$490,000.

* * *

Wisconsin.

Wisconsin has broken another record.

Speaking at the Wisconsin farmers' course on last month, A. R. Hirst, chief engineer of the Wisconsin highway commission, declared that no state in recent years has shown such a remarkable increase in road building sentiment, and that in no state have the appropriations for state aid road work increased as rapidly as in Wisconsin. He and other members of the state highway commission feel that the increase in the appropriations has been too rapid for the most economical results and would prefer to see a slowing down until contractors, county highway commissioners and foremen are trained to properly and economically construct the work.

Considering the fact that there have been but two years in which to develop state aid roads, Mr. Hirst expressed himself as well pleased with the results, both as to cost and efficiency of the roads.

It is universally conceded that the state aid work so far done is very much superior to any other road building done in the respective neighborhoods heretofore; but a quite common criticism is that the work has cost too much. This criticism, Mr. Hirst said, usually comes from men not fitted by training or experience to judge what the work should cost.

Mr. Hirst predicts that during the present year between 1,500 and 1,600 miles of state aid roads will be built in Wisconsin.

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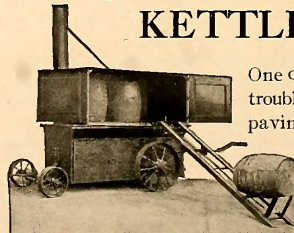
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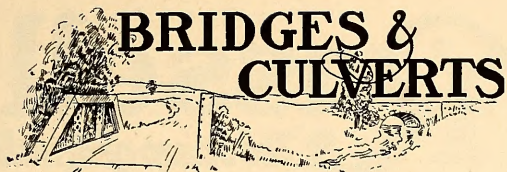


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The commissioners of Sumter county, Georgia, have contracted for two steel bridges to cost \$9,500.

The commissioners of Henderson county, Kentucky, will build an expensive bridge across Highland creek.

A \$50,000 bridge is to be built in Baltimore by the Pennsylvania railroad. The bridge is to carry Market street across the railroad's tracks and is to be paved with wood blocks.

The supervisors of Forrest county, Mississippi, will build a bridge across Chainey creek.

Tipton county, Tennessee, voted \$25,000 of bridge bonds.

Union county, Tennessee, is asking for bids on a 90-foot re-inforced concrete bridge.

Elgin, Texas, has voted \$30,000 of bonds to repair bridges and culverts.

Waco, Texas, has available for the building of bridges and culverts a \$50,000 bond issue.

Dickenson county, Virginia, will build 5 steel bridges within the next few months.

State Highway Commissioner, G. P. Coleman, of Virginia, announces that a 115-foot bridge is to be built across the Holston river in Smythe county.

Botetourt county, Virginia, will issue bridge bonds for \$20,000.

At Charleston, West Virginia, a bridge is to be built across the Kanawha river at a cost of \$265,000. The plans call for a concrete road way and the bridge will be about 400 feet long.

The commissioners of Jefferson county, Alabama, will spend \$40,000 on a bridge to replace the Jasper Ford bridge.

Walker county, Alabama, will bridge the Warrior river at Gordova.

Chambers county, Alabama, will spend \$32,000 in building bridges and culverts along the Dudleyville road, 11 miles.

It is reported that a bridge is to be built across Rolling Fork river at Woolridge's Ferry, connecting Hardin and Bullitt counties, Kentucky.

The commissioners of Harrison county, Mississippi, will bridge the Tchoustaicabouffa river at a cost of \$6,300.

The commissioners of Cumberland county, North Carolina, will build two concrete bridges across Big and Little Rockfish creeks.

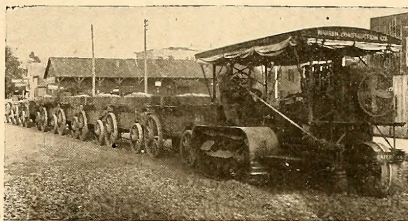
The commissioners of Canadian county, Oklahoma, will build 24 steel bridges.

Tallapoosa county, Alabama, will construct 28 miles of roads.

Johnson City, Tennessee, has contracted for asphalt paving to cost \$50,000.

Raleigh, North Carolina, will vote soon on a bond issue of \$100,000 for street paving.

The city of Asheville and Buncombe county, North Carolina, will construct a two-mile boulevard at a cost of \$47,000.



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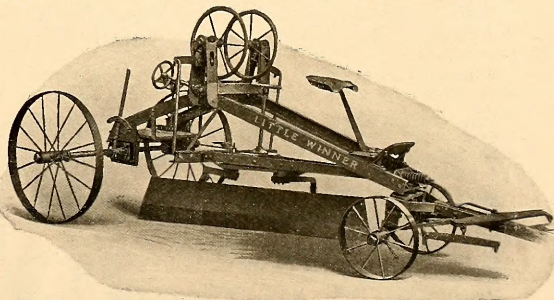
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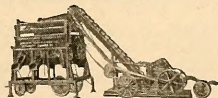
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CHAMPION Portable Crushing Plants are made in all sizes. Bins, Elevators and Screening Machinery. SEE AD ON PAGE 38

THE GOODS ROADS MACHINERY CO.
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GOOD ROADS NOTES IN BRIEF

Simpson county, Texas, votes on April 18 on a bond issue for roads amounting to \$100,000.

Baltimore, Maryland, let contracts for street paving last month amounting to \$165,000.

Richmond, Virginia, has contracted for 10,000 square yards of bitulithic on Main street.

St. Louis, Missouri, has contracted for street paving amounting to \$85,000.

Chilton county, Alabama, will build 13 miles of state-aid road.

Marion county, West Virginia, will build 18 miles of brick and concrete road in Mannington district.

Galveston county, Texas, has contracted for 34½ miles of roads.

Pulaski county, Arkansas, has contracted for 6½ miles for roads.

Road district No. 6, Lonoke county, Arkansas, will build 12 miles of macadam road.

Weleetka township, Okfuskee county, Oklahoma, will spend \$25,000 on 25 miles of road.

Road district No. 2, of Lincoln county, Arkansas, will build 21 miles of macadam roads.

Sumter county, South Carolina, will build six miles of sand-clay road.

The state roads commission of Maryland has contracted for oiling 420 miles of roads, requiring 1,225,000 gallons of oil.

The greatest chasm between the producer and the consumer is the mud hole.

The highwayman takes your money in spite of yourself. You help bad roads take it.

Without good roads, there can be no development that will be permanent and enduring.

The elementary principles involved in improved highways are social and domestic happiness and business economics.

Man is made of dust, and to dust he must return, but if he lives on a bad road he must have dust or mud all his life.

Three things that should receive attention in road making are: First, grades; Second, System, and Third, maintenance.

Minnesota is at work constructing paved and gravelled roads with a state aid fund of the same size from which the state pays half, the county one-fourth and nearby lands one-fourth. The county issues bonds to anticipate state, county and special property levies for ten years.

Bradentown, Florida, has \$100,000 available for street paving and will spend it on vitrified brick pavement.

Marshall county, Alabama, will let contracts on April 7 for 33 miles of roads.

Cabell county, West Virginia, has \$300,000 available for road-building and contracts for much work will be let in a few weeks.

King George county, Virginia, will contract soon for four miles of good roads.

Richmond, Virginia, is asking for bids on street improvements, estimated to cost \$250,000.

Creek county, Oklahoma, will build 40 miles of good roads at a cost of \$100,000.

Oxford, North Carolina, will spend \$25,000 on streets.

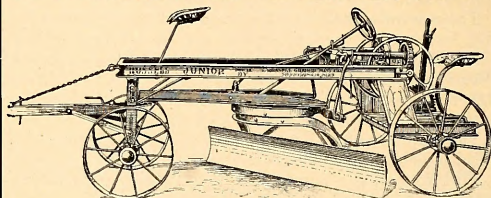
Lincoln county, Arkansas, has let contracts for 13 miles of road.

Two districts in Wise County, Va., recently voted \$230,000 to finish macadamizing roads already graded with a county bond issue of \$700,000.

Russell

"The Stamp of Quality"

You have probably heard a lot about the big Russell Machines—the Elevating Grader, the Mogul, etc. But don't ever lose track of the genuine merit of the SMALLER Russell Machines, many in number and for every purpose.

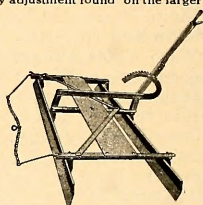


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A Reversible Road Machine built for four horses but can be handled by two where the work isn't too heavy. It has every adjustment found on the larger machines. Front wheels "cut under" to permit to main turns. Has no equal for a mammoth square tain roads.

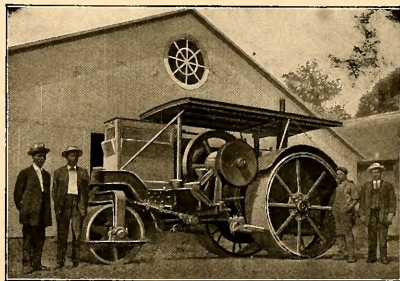
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This combination of three machines in one saves the purchase price of one or more engines. The engine runs on kerosene or gasoline, allowing you to use the cheapest and most convenient fuel. An I H C road-roller tractor can be depended upon to do any reasonable amount of work that may be required of it.

I H C road-roller tractors are made in 20 and 25-horse power sizes. The change from a road roller to a tractor is made in a few minutes and requires no special mechanical skill.

The I H C line also includes stationary, portable and skidded engines in 1 to 60-horse power sizes, tractors in 6-12 to 30-60-horse power sizes, hoisting engines, sawing and grinding outfits, etc. Catalogues of any or all of our engines will be sent on request.

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(Incorporated)

151 Harvester Building

Chicago U S A

Mr. Lee's Farewell Letter.

Mr. W. I. Lee, former county highway engineer of Tazewell, before leaving for his new work in Mercer county, West Virginia, addressed the following letter to the board of supervisors, the county officials and citizens of Tazewell county:

I have given up my position with the State Highway Commission, and forwarded my resignation to Mr. Geo. P. Coleman, State Highway Commissioner to take effect March 10th, and have accepted a position in Mercer county, West Virginia.

Before leaving I desire to express to one and all my feeling of appreciation for the uniform courtesy ex-

think there is no one thing that will more rapidly promote the interest and welfare of the people.

I truly believe we are on the eve of a great industrial development in the south. The eyes of the world have been gradually drawn towards this section's possibilities; soon we will be in close proximity with the world's commerce by way of the Panama Canal and those localities that will be caught in the van of this march of progress and internal development must be made easily accessible with a system of roads.

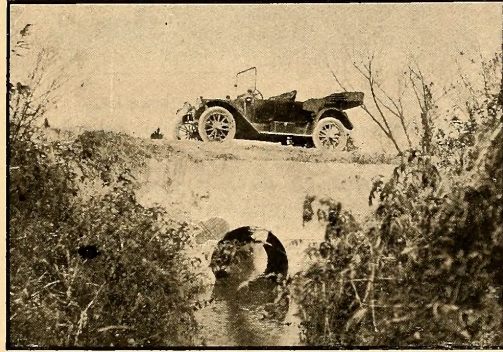
Reference to the last annual report published in the Tazewell papers recently, will convince you that the roads laid out under the bond issue cannot be completed with the money in hand.

Without reflecting on any one, it is unfortunate that the road system could not have been planned from the viewpoint of economics, rather than that of votes. By this I mean, plan your county road system, so the class of road in every community will be justified by the annual traffic it is to carry, leaving latitude for increasing the class of those roads that will become inter-county and perhaps inter-state; with these roads well built they offer inducements to the people from a distance to come in, sojourn and mingle with you, exchanging ideas, and consequently the roads become educational.

You have a good county, and I would advertise it, let others know what you have, and with your good roads many will come and see for themselves. If this road system is properly planned, every citizen of the county will reap some benefits though he may not live directly on an improved road, others to the contrary notwithstanding.

I desire to call your attention to the important question of maintenance. It is a crime against your county to spend money in improving roads and not provide some system of intelligent upkeep; to do this economically maintenance must commence co-existent with the completion of the road, and by all means have the work intelligently done. One not knowing the reasons why certain things are done during construction would certainly not know how to maintain the road, and possibly do a serious injury with good intentions.

I feel that I have many friends here which I am loath to leave, but I think the Mercer county, West Virginia road work, offers inducements where I will have a chance to broaden out my sphere of usefulness.



One of Harry Brothers' 48 inch metal culverts on the Central Highway in Lenoir county, North Carolina.

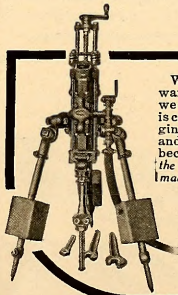
tended during my sojourn among you, as well as call your attention to some views concerning roads. Coming here from Augusta county during the early summer of 1912 to assume charge of construction in Jeffersonville and Maiden Spring districts, a stranger to the people, the topography of the country, and the labor conditions, on work in progress by the force account method, I thank you again for the consideration accorded me.

The law under which we are operating gives concurrent jurisdiction on the work to the State Highway Commissioner and the County Board of Supervisors.

We have in the past had differences which I know to have been honest; and where questions were presented for my decision it has ever been my effort, certainly my intention so to do, to decide by logical reasoning based on what is just and right.

I think we have some very fine pieces of macadam road in the county, evidence of which will be demonstrated by the fact that the local photographer here took several prizes offered by the Southern Good Roads Magazine during the last season for the best road photographs.

It is my earnest desire to know that the road work will be continued in an economical manner to final completion. I am deeply interested in improved roads and



Wood Rock Drills have been on the market upwards of twenty years, and the fact that today we are selling more Wood Drills than ever before is conclusive proof of their sterling merit. Engineers don't buy failures; they buy successes, and they buy the **Improved Wood Rock Drill** because it is a tried and proved success. This is the Drill in which Cylinder, Chest and Air Head are made of Vanadium Tungsten Iron.

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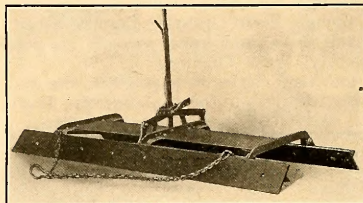
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Blades 8 ft. long, 8 in. high. Weight 285 pounds.

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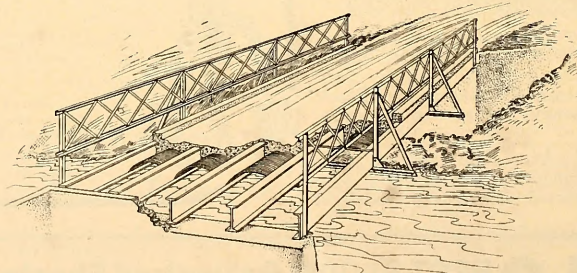
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TO THE HONORABLE ROAD OFFICIAL,
South Everywhere

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Small bridges like this, or modified as desired, for concrete floor or wood floor, are kept in our stock in Roanoke, Memphis and Atlanta. Lengths from 5 ft. to 40 ft., any width, any quantity, quick delivery. Current metal prices make attractive quotations.

These beam spans are easily erected by your road forces as are, also, our small truss spans up to about 80 ft. length.



We will gladly figure on your requirements, large or small, delivered or erected.

Yours very truly,

VIRGINIA BRIDGE & IRON CO.

SOUTHERN GOOD ROADS

Published Monthly
By Southern Good Roads Publishing Co.

Lexington, N. C., May, 1914

Entered at Lexington Post Office as
second class matter

West Virginia's Roads and First Needs

By A. DENNIS WILLIAMS

Chief Engineer, West Virginia State Highway Commission

THIS is a red-letter day in West Virginia. We are today writing a new chapter in West Virginia's history. To give the history of the roads of this state would be to write the history of its people. The story of the pioneers who braved the wilds of the wilderness and made possible the civilization we enjoy today is written in the trails and blazes which by a process of widening has today become our roads. The paths of the wild beasts and the cattle have become roads through constant usage. This being true, it would probably not be out of place for me to turn aside for a moment and review as it were briefly the history of the roads we now have, because I want to say in the beginning, and hope to prove to you before I conclude that the roads of this state as a whole are not the product of engineering skill but the outgrowth of a custom.

The majority of our main or trunk line roads, if you will but reflect in your minds, such as the Old Northwestern Turnpike, Staunton and Parkersburg Pike, which is an exception, as it was located by Col. Claudius Crozet, an engineer; the old James River and Kanawha Turnpike, which was once known as the old Sandusky and Richmond Trail, the Giles, Fayette and Kanawha Turnpike, the Weston and Gauley Bridge Turnpike, and many others that I could mention, are located along the summits of ridges or on the watersheds which would indicate that the earliest travellers made the blazes that later developed into paths, and finally these paths into roads. A study of these conditions leads us to believe that the first blazes were either made by the mound builders who were seeking to dodge the water courses, or by the buffaloes and other animals tramping through the forests, perhaps to both. In either case, we can ascribe to them no marks of engineering skill, but must say that they are roads of chance.

In the antebellum days when the only mode of travel was that of the stage coach, some thought and attention were given to the roads, but with the development of the steam roads, our colleges and universities practically abandoned research in the construction and maintenance of public highways and began to concentrate on the economics of railway engineering. This seemed to serve the demands of the people and of the country. But with railway development, came a new problem, or in other words the railway made possible the great cities and the industrial development

therein. This development has placed upon the country a new burden which the railroads cannot lift from the shoulders of the people.

The cost of living for some years back has been advancing. Politicians and theorists have offered remedies, but steadily prices have gone up. The scientists and students of economy have bended low over their desks to discover the cause. The result has been the untried theories. Each of these have been taken in turn but the patient—a burdened public—has found no relief. The railroads have confessed their inability to solve the problem. The politicians have doctored the tariff and given us other legislation, but the remedy lies not in these, but in producing more and consuming less, in proportion to our population. This cannot be done unless we can get the material produced from the place of production to the place of consumption within a reasonable time and at a reasonable cost. To this truth the people of the country have awakened, and in the past two or three years universities and engineers are beginning to devote their attention and time to the task of solving the problem of the public roads. It is also notable to observe that engineering societies and scientific students are giving thought and talent to the subject. A subject that has been before us for centuries, yet considered unimportant, or in other words considered so little as to be below the vision of the trained engineer. New methods of transportation turned over the long supposed eternal macadam which has made necessary a re-consideration of the highway problem. Engineers and institutions of learning have laid their hand to the wheel, and are now trying to solve the problem they have long neglected. They have found more complications than had confronted them in railway work. So complicated have they found the problem that the best authorities are yet unagreed as to the best road materials under all conditions, and that instead of it being a passive problem, it is a live issue and the most important that confronts the engineering profession as it effects the most people. It has too long been considered that it took a well trained and competent engineer to locate and build a railroad, but that anyone could locate and construct a highway, which had more complex angles than the railway. But a new era seems to be dawning upon us. The public mind is beginning to realize the importance of specially trained men and the value of their service in the development of public enterprises as much so as in those of a private nature. As an example of this, the

announcement last week of the city of New York paying its highest salary to its engineer and of the city of Dayton selecting an engineer as its manager to rebuild from the effects of the flood, is a fair indication of the trend of thought.

The thought of the country is guided by the investigation of our greater seats of learning. Therefore, our universities occupy an important position in this movement. The university can furnish adequate instruction in highway engineering, besides the trained talent on the professional staff of our state institutions can be of vast benefit and will be if the people of this state but show an appreciation of the efforts put forth in the hours of research and investigation. The above examples prove that they will and the demand is now for men to train themselves for the work that is at hand. To this task, the West Virginia University has come forth. Your presence here today show that you realize the need of a closer co-operation between our University and its supporters, the people. Your presence here today, the placing of this course on the program and in the bulletins of this institution has a deeper significance, than may now be apparent. It gives an answer to the question why that colleges once teaching the dead languages and catering only to the prospective minister, teacher, lawyer and doctor, are adding to their curriculum courses in agriculture, road building and many other practical vocations. Education has the whole field of our present civilization, and it is the great co-operative agency through which material forces are converted into productive value. The placing of these courses does not lower the standard of our colleges, but broadens the field of usefulness, neither

has learning lost any of its sacredness, yet some may tell you that unless you are versed in the languages, you are not educated. This may be true, but it is of vastly more importance to us in West Virginia as West Virginians to know West Virginia and how to construct a system of roads that will make possible better schools and churches, more prosperous and happy homes, than to be able to read the Iliad or translate the thoughts of Homer.

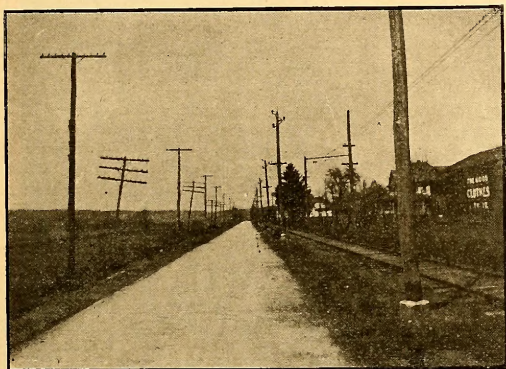
There are in West Virginia 15,374,180 acres of land. In 1900, 10,654,513, acres were in farms, while in 1910 10,026,442 acres were shown as farm land. Of this amount, 5,521,757 acres improved farm land. This farm land is divided into 96,685 farms. The total production of these farms according to the census of 1910 was valued at \$40,374,776. According to the same census it is shown that this was produced on about 19% of our land area. While our total agricultural area is about 63% of the total acreage of the state. Last season the total product of our mines, oil and gas wells was about \$80,000,000. Our food bill was approximately the equal of the output of our mines and wells. Thus we consumed all we raised and one-half the products of our natural wealth. We are depleting our coal areas at about 1000 acres per month, and our oil and gas fields at a rate we cannot estimate, but we are not keeping the proceeds. Our farm lands are being neglected and the money from our natural resources is being carried to other states to supply food stuff that could be but is not raised in West Virginia. West Virginia land is fertile and the only reason that can be given for this condition is the transportation problem over the country roads. Therefore, the first thing that we need in



Road Working Day in Ritchie County, West Virginia. Reading from left to right the working citizens are Lawyer Sam Powell, Lawyer Robert Blair, Jr., Judge H. B. Woods and Prosecuting Attorney T. J. Davis

our agricultural development is a road from the farm to the market. In this I believe you will agree with me, but the first thing necessary in getting this road is a competent man to locate it, and when located, in order to get it properly constructed it is necessary to have a competent superintendent and constant supervision. In this I believe that you will also agree with me, because you know as well as I, that for many years past we have paid taxes and worked our roads but are no farther advanced or in fact in many places not as far advanced as we were a quarter of a century ago.

We will raise for permanent roads to be expended during 1914, on the tax levies of 1913, \$299,293, for bridges \$314,142, for general road purposes \$1,724,334, or a total of \$2,337,769. There will be approximately a million and a half funds from bond issues to be expended this year or about four and one-half times the available funds of 1913, as best I can obtain. With this increase in available funds we should make a very creditable showing in this state, but to do this we must apply the best skill obtainable, not only the best skill in location, but in ascertaining the best material and in getting the best construction. Some counties have



One of many fine roads around Parkersburg, West Virginia

abandoned their county engineer. In some instances from what I have observed I think this was probably wisdom, under the existing conditions, but no county should attempt important construction or the issuance of bonds without the service of a competent engineer. I say competent engineer because there are in the engineering profession, as well as in other professions, men who are not competent, and in many instances in this state, I am sorry to say, that this class of engineers, though costing but little for engineer's salary, has been very expensive, and the sooner these conditions are pointed out the better it will be for the people. No way can this be pointed out better and quicker than by such men as yourselves gathering here and studying our problems collectively.

Our first need then is trained men. Next, is constant supervision of construction and vigilant maintenance. We will need to thoroughly understand what our roads are required to bear, a traffic census, because this will be the only guide by which we can determine the demands upon the road, and the kind of construction necessary to meet these demands.

We will need a thorough study of our local materials in each locality and as to how to make them most available for our local use, because we want to guard against long hauls and the possible bondage of patented processes. No state in the union has more road

problems than we have, but few have as many, and doubtful if any have so many varied soils and conditions, but likewise, we have practically all materials.

We need to make a study of our state as to its agricultural demands upon the road and also its possibilities from the tourists that can be attracted by its scenic beauty. The state of Colorado estimated that the tourists last season left with it \$3,000,000. The state of Maine estimated that the tourists and hunters for the year 1913 was worth \$20,000,000 to its people. This could be made of more value to West Virginia. The great Architect and Teacher endowed us with all these attractions and placed at our disposal many healing springs with a climate in the summer season unsurpassed. Therefore, we should locate our roads, first, with a view of being the most advantageous to the agricultural interests of the state, but should keep in mind the aesthetic and scenic side as well.

There is opportunity here for a broad and lengthy discourse but the purpose of this paper is to call your attention to the first needs in connection with West Virginia roads, and in conclusion they are briefly summed up. Trained men to honestly study the local situation in each locality including the possibilities of development from an agricultural, social, industrial, and scenic standpoint, and to locate where conditions demand new roads or revise old ones ever keeping in mind the needs to which the road must answer as a basis of the class of construction and the amount of money to be expended thereon, and to direct the expenditure and repair of these roads.

Because as I see the situation in this state the most important thing that confronts us in our development is our public roads and the most important in the development of our public roads is a scientific application of our funds, which can only come through the hands of trained men.

West Virginia Good Roads Days May 28 and 29.

Mr. A. D. Williams, chief road engineer of the West Virginia State Roads Bureau, has sent out the following letter, under date of April 20th:

"Governor Hatfield has declared May 28th and 29th as 'Good Road Days' for the state, and requests the co-operation of every county and district road official in making them a success. I trust that you will get busy immediately in your county and district and arrange to get the most satisfactory results from these two days by getting everybody in your section to either contribute two days' work or hire some other person or team. One district in Tyler county has, outside of declaring for two days' labor, raised \$200 by private subscription to be applied on the roads in connection with this special free labor.

"This office is at your command for plans and specifications and I trust that between now and that date all officials in each county will get together and arrange plans of work. A special pamphlet for this occasion will reach you about May 10th, but in the meantime do not let an opportunity pass to agitate and stir your people for this occasion."

An attractive piece of trade literature is the new catalogue just issued by the Koehring Machine Company, of Milwaukee, Wis. It is No. 19 and the handsomest of the series. The catalogue is devoted exclusively to the famous "Koehring Concrete Mixer" and contains many very beautiful cuts showing the Mixer at work under all sorts of conditions and on all sorts of jobs. There is much information in the booklet that will prove of great value to all contractors who have concrete work to do.



GOVERNOR HENRY D. HATFIELD, OF WEST VIRGINIA

State of West Virginia

Executive Department

A PROCLAMATION :

To the People of the State of West Virginia, Greeting:

WHEREAS. The urgent need of good roads has brought to us one of the greatest problems of this day of unprecedented progress and is recognized by all as a commercial improvement that will result in the greatest good to the greatest number; and

WHEREAS, There obtains a unanimity of opinion that no effort or expenditure could bring quicker, surer or greater dividends than that directed toward the construction and improvement of our public roads; and

WHEREAS, In this State the people are fully awakened to the benefits that will be realized from better roads, linking together in ties of closer relationship the different communities and affording avenues of commerce; and

WHEREAS, The construction and betterment of roads is a matter of direct concern to every citizen;

NOW, THEREFORE, I, Henry D. Hatfield, Governor of the State of West Virginia, do hereby set apart Thursday and Friday, May 28 and 29, A. D. 1914, for road work in the State of West Virginia, and do designate the aforementioned days as "Good Road Days," and declare the same public holidays and request that all other business be suspended as far as possible and that every able bodied citizen labor upon the public highway of the State during these two days, and that the work performed be of a kind that will make a lasting and permanent improvement, such as road grading, ditching, culvert building, graveling, dragging, etc.

I further call upon the county court of each county to issue a proclamation calling upon the people to turn out on these days and give their labor, and to see that a complete organization is effected, so the work will penetrate to every neighborhood and be conducted in a thoroughly systematic way, so that when the end shall have come at the close of the second day there will be no community or district within the borders of the entire State where there has not been indelibly stamped by the hand of toil marked progress in road improvement that will bear testimony to the progressive spirit possessed by the people of that community.

I urge upon the county and city press the importance of giving their liberal assistance in organizing and bringing to the roads for work an army of volunteers, citizens ready to do service in advancing the welfare of the people of each community. The liberality of the press is one of the requisites to the success of West Virginia's first "Good Roads" days.

I also call upon the various commercial organizations of the State, the road overseers, road engineers and all those directly or indirectly identified with the movement for advancement of good roads to give their enthusiastic and united support in order to carry out this undertaking to a successful completion.

I hope the women of West Virginia will feel it their duty to participate in the work and share in the glory of the day. I, therefore, call upon them and their various organizations to prepare dinners and to see that they are served to the laborers along the way, thereby showing their loyalty and interest in this great cause. It should be the aim of every West Virginian to see that these two Good Roads days will stand as an epoch in the movement for the development of the highways of every state, and the man who gives his labor and energy zealously in this cause may well feel that he has performed a true public duty, the importance of which can only be estimated at this time. This will be the most significant public work ever performed in this State, and the degree of its success rests upon every loyal citizen.

We will be able to enjoy the fruits of our labor, but our posterity will enjoy it in even a larger and more appreciative measure. The most certain way to advance the State and all of its diversified industries is through our roads.

I hope the people of the State will enter heartily into the spirit of the occasion with earnestness and enthusiasm and a desire to see that the accomplishment of these two days will be of surprisingly great intrinsic value. If we are zealous in this pursuit we will give to the Good Roads movement an impetus that could not in any other way be obtained.

In testimony whereof, I have hereunto set my hand and caused to be affixed the Less Seal of the State of West Virginia.

Done at the Capitol, in the City of Charleston, this the twenty-third day of April, in the year of our Lord one thousand, nine hundred and fourteen, and of the State the fifty-first.

By the Governor:
STUART REED, Secretary of State.

HENRY D. HATFIELD

A General Review of the Road Situation in West Virginia

NEVER did the people of Mason county respond more nobly to a hurry call of any kind than they did for the good roads meeting which was held at the court house at Point Pleasant Saturday, March 28. Every district in the county was represented and it has been conservatively estimated that more than two hundred and fifty men from over the county were present, not counting those who attended from Point Pleasant.

The Point Pleasant band deserves special mention for their part in making the meeting a success. The pieces which they rendered were of a high class and were greatly appreciated by their many hearers.

Mr. A. D. Williams, state road engineer talked for more than an hour on the question of good roads. He

Virginia Good Roads Association and West Virginia division of the National Highway Association.

Before adjourning for noon the chairman announced that the session afternoon would take up the matter of organization.

At the afternoon session while the committee on by-laws and constitution was in session, the chairman took occasion to call attention to the fact that a soil expert and demonstrator had been employed for Mason county and would begin work April 1st.

The committee on by-laws and constitution then presented their report, which was unanimously adopted.

R. P. Bell was elected permanent Chairman, P. T. Burdette, Secretary and Peter Steenbergen, treasurer. The following were elected as permanent ways and means committee; Lewis district, L. C. Somerville; Robinson district, J. F. Burdette; Cooper district, J. T. Green; Graham district, J. A. Blain; Hannan district, H. E. Ball; Union district, Frank Hill; Arbuckle district, Henry Sommer; Cologne district, W. M. Dixon.

The following Vice President were elected; Robinson district J. O. Shiun; Lewis district, S. H. McNeill; Cooper district, J. F. Roush, Graham district, M. G. Tyler; Clendennin district, W. S. Reece; Hannan district, H. W. Stribling; Arbuckle district, E. W. Kerns; Union district, J. A. Dunn, and Cologne district Willard Greenlee.

The following report by the ways and means committee was read and adopted "The ways and means committee, of the Mason County Good Roads Association beg leave to report that this committee recommended.

First that the vice president of each district appoint three men in his district to solicit membership to this association.

Second. That every person in the county be considered a member of this association, but that the voting power be limited to those paying a membership fee as prescribed by the by-laws.

Third. That we recommend that the present levy law be changed so as to permit a permanent road levy of not to exceed twenty cents on the hundred dollar valuation.

Fourth. We recommend that the county court authorize the use of drags on the roads.

Fifth. We recommend that all roads be placed on good grades as fast as possible and the grades limited to five per cent as required by law.

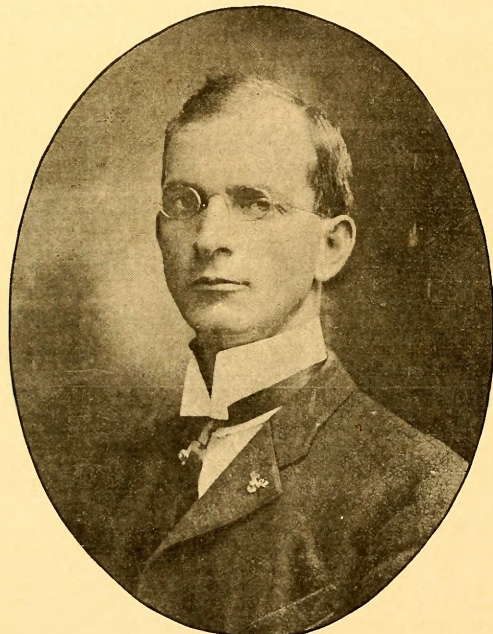
Sixth. That the county court enforce the law in relation to deposit of organic and other deleterious matter in the roads.

Seventh. That the county court require the property owners along the road to keep their fences back to the road line.

Eighth. We recommend that hereafter all maps and surveys used in establishing roads be records in a permanent record book.

Respectfully submitted J. F. Burdette, chairman, ways and means committee and L. C. Somerville, secretary.

The purpose of the above organization is to promote a greater interest in the movement of good roads in the state of West Virginia; to help disseminate information and literature bearing upon the subject of road



J. M. OLIVER, JR.
County Highway Engineer of Cabell County, West Virginia
A progressive leader of a progressive county

made the statement to a newspaper present that his audience was one of the most representative that it had been his pleasure to address.

The meeting was called to order at 10:30 o'clock. R. P. Bell was elected temporary Chairman and Peter H. Steenberger temporary secretary. After briefly stating the purpose of the meeting the chairman appointed a temporary ways and means committee and committee on by-laws and constitution. Mr. A. D. Williams was then introduced and delivered a very instructive talk on the good roads movement of the state and explained that the best plan for those present was to organize into a body known as the Mason County Good Roads Association, of Mason county, as a division of the West

improvement; to promote a closer educational, religious and social intercourse; to assist in developing the agricultural, horticultural, mineral and industrial resources of the county by helping to secure better highways; to assist the county and district officials in highway construction and maintenance, and to help secure the most economical expenditures of the road funds of the county and of the state; to assist the state organizer in a campaign of education for better roads and to co-operate with any and all other organizations which have for their purpose the uplift of the community and the achievement of the citizenship of our county and state by making home life more comfortable, prosperous and happy.

It is the intention of the organization to hold district good roads meetings at early dates and also to have a big good roads barbecue with good speaking and plenty to eat on the Fourth of July at Point Pleasant, at which time it is hoped that more than a thousand of citizens of Mason county can be assembled in the interest of good roads.

Randolph County.

The Randolph County Good Roads Association had a dollar dinner at the Randolph Hotel, Elkins, W. Va., Wednesday evening, March 25th. Eighty nine representative citizens of Randolph and Barbour counties including the county courts of each county were seated at the table. Speeches were made by all members of the county courts of each county, the mayor of Elkins, State Road Engineer A. D. Williams, and others. It was unanimously voted to back the governor in his holiday for patriotic road making. Hon. E. D. Talbott presided as toastmaster, and was given the title of "road master."

Wood County.

State Road Engineer A. D. Williams of Morgantown, and County Commissioners Burdette Woodyard, Perry Nicely, J. W. Owens, of Wood county, W. Va., made an all day hike over the roads in Williams district which are to be permanently improved with the money to be derived from the sale of the \$70,000 bond issue, which recently carried at a special election there. With these officials in the hike were the following prominent citizens of Williams district: George H. Mealey, W. P. Beeson, Wirt Kellar, Charles Reed, James Cochran and J. W. Alexander. This delegation of ten men spent an entire day upon the roads to be improved, going over the situation to discuss possible changes in the road bed and other details which must be gone over before the contracts are let. The day's work will no doubt be productive of great good in connection with the improving of these roads.

State Engineer Williams stated to a reporter, after the hike, that at the suggestion and request of President Burdette Woodyard of the Wood county court, he has decided to call a meeting, to be held in Parkersburg on April 22nd, to confer with the county commissioners and other county and district road officials from the counties of Wood, Pleasants, Ritchie, Wirt, Jackson, Roane and Calhoun. The object of this meeting is to hold an institute for one day in road building and also to confer with the members of the county court of the various counties upon what roads shall be improved in order to connect up the various counties.

It is proposed to follow the plan adopted in the southern end of the state to connect up the county seats of the various counties of the state with good roads. For example, each county improve roads that would connect with the roads from the other county connecting Parkersburg with Elizabeth, Harrisville, Ripley, St. Marys and other county seats. The scheme

is that if these main arteries of travel are improved it will not be long until the minor ones are taken up and improved in the same way.

The supreme court of West Virginia in the case of Clay district against Wood county decided that two and one half per cent was the limited amount of bonded indebtedness that any county or district could have in that state. That is the amount fixed by the legislature but the constitution limit is five per cent.

Burdette Woodyard was recently made county road engineer for Wood county.

Ohio County.—Will Put Men to Work Soon.

Just as soon as the weather man will permit, County Road Engineer George Steenrod will have men at work in every part of the rural sections of the county improving roads. If the roads dry out sufficiently, the big rollers will be sent along the roads, about the middle of the month and then stone will be scattered, from the five quarries now being worked.

Three quarries are now being worked on Short Creek and it is expected to secure about 2000 yards of limestone from these. Two quarries are being worked on Cherry Hill, above Warwood, and these are expected to



Eating a fine dinner served by the ladies on Good Roads Day, Ritchie County, West Virginia

help out on the Short Creek road. Lines are being laid out on the river road and Contractor McNabb is quarrying stone for the completion of the big contract.

As soon as the weather opens up, another mile of asphalt road will be laid along Long run, on the Greggsville, Clinton and Potomac road. The Ball Engineering Co., is in charge of this work. The work of paving in Thedah Place is also awaiting good weather. Brick has been received for the paving of the mile of the National Pike from Triadelphia to the Gashell Run bridge. A concrete wall will be built at the Germantown bridge and two fine concrete bridges will be built above Greggsville. Road signs will be placed in the hands of the supervisors and will be immediately placed at points designated by the road engineer.

Must Build Road Drains.

County Road Engineer George Steenrod has sent out notices to the seventy two road supervisors that the thawing of the roads requires that drains be constructed, so that the roads will not be injured by pools of water. The melting of the deep snow drifts left behind copious quantities of water that always proves damaging to the roads, making the mud very soft. Traffic of a few days will tear the road up badly. This situation can be prevented by proper drainage.

Engineer Steenrod has also warned the supervisors against removing any more of the signs of the Carnation

chewing gum makers. The advertising agency has been notified to remove them within ninety days and if this is not done the county will probably take the matter in its own hands.

Organizations Plan Combine.

Plans to consolidate the West Virginia Good Roads Association and the West Virginia Automobile Association, at least in so far as their efforts towards road improvement are concerned, have, it is understood, been taken up by Elmer Hough of Wellsburg, President of the automobile association and A. D. Williams of Morgantown, state road engineer and secretary of the good roads association.

No decision has been reached as yet, but the proposed amalgamation is being given serious consideration. Both organizations seek to accomplish the same prime object, that of bringing about an era of good roads in West Virginia. So, long as they work separately toward this point they are bound to be at cross purposes many times. It is in order that their efforts may be more successfully concentrated that the amalgamation has been taken up.

Millions to be Spent in West Virginia For Road Improvement.

Probably no other state in the union has within such a short time undertaken the expenditure of so large a sum for good roads as has West Virginia, and this not as a state alone, but as the progressive enterprises of the people in the several counties. Irrespective of the amounts due the state on the Lever act, the counties of West Virginia have voted to expend \$1,430,000 on the construction of good roads, while expenditures amounting to more than \$2,000,000 in addition are under consideration.

These figures cover the plans decided and pending in fourteen counties of the state, and in the remaining 41 counties the good roads movement is a live issue, and receiving encouragement everywhere. These measures are in a great measure due to the zeal of State Road Engineer A. Dennis Williams, the State Road Bureau co-operating with the West Virginia Good Roads Association, which is affiliated with the National Highway Association, and other kindred organizations, such as the state grange, the farmers' clubs and the agricultural associations.

Expenditures so far authorized include the following: Marshall county \$150,000; Marion, \$300,000 for the Fairmont Magisterial district and \$400,000 for the Manning district; Cabell county \$300,000; Wetzel county \$150,000; Wood, \$70,000 for the Williams district; Mercer \$500,000, Pleasants \$60,000—a total of \$1,430,000.

Expenditures now under consideration, a large proportion of which will undoubtedly be authorized include these: Fayette, \$900,000, Raleigh \$200,000 Nicholas \$600,000, Kanawha estimated \$500,000, Braxton estimated \$100,000, Lewis estimated \$100,000 and Harrison estimated \$300,000. Clay district Wood county \$40,000, Bailey'sville district, Wyoming county, \$36,000. This makes a grand total \$4,130,075, enough to build many miles of brick and concrete roads, not only to curtail the expense necessary in the use of six and eight horse teams, where two horses could easily do the work of hauling, were the roads in good condition, but also as an invitation to automobile tourists, who are already sending into this state many inquiries concerning the routes best to travel in reaching the hundreds of resorts, mineral springs and hunting and fishing grounds within the boundaries of the state.

In the progress of improvements already undertaken Mercer county leads, expending \$500,000 on a sys-

tem of new roads begun about a year ago. Marshall county started improvements to cost \$150,000 on the Boggs Run road in Union district, and this is about one third completed. Wood county has recently authorized the expenditure of \$70,000 on the Williams-town roads. Pleasants county has also authorized the issue of \$60,000 bonds for road building.

Fayette will soon hold an election on the proposed issue of \$900,000 bonds, to make modern the James river and Kanawha pike. Fayette county's proportion of this improvement will cover 42 miles. Giles, and Kanawha, 41 miles.

Mercer county will take up the work and complete 25 miles additional of the Totten pike, which will complete the improvement in the southern extremity of the state, leaving Raleigh, Nicholas, Braxton, Lewis, Harrison, Marion and Monogahela to carry the work to the Pennsylvania line where it is proposed to connect with the national pike running to Pittsburg.

Big strides have been made in the building of the state road from Charleston to Huntington. Cabell county has authorized the expenditure of \$300,000 to brick the highway and improve others, and Kanawha county now proposes to issue \$500,000 to carry the road through that county. From Charleston this cross-state highway will be extended further east.

Reducing High Hauling Costs.

Horses are at present the principal motive power used for hauling farm products in this state. Edison has said that "the horse is the poorest motor ever built. He eats 10 lbs. of feed for every hour he works and yet his thermal efficiency is only 2 per cent." In other words, 98 per cent of the energy supplied to the horse is wasted in so far as useful work is concerned. His average speed with a load is from two to three miles per hour, so the farmer will spend a long day in making two round trips where the average haul is 7.8 miles. In poor road districts one trip per day will be the limit and in bad weather no loads can be moved.

The road factor also enters into the problem. Good roads mean large loads, maximum speed, and low hauling cost; poor roads, the reverse. Illinois has poor roads; in fact, very poor roads in comparison with those states which have followed a progressive policy of road building. Over 95 per cent of the roads in this state have an earth surface. Properly constructed and maintained a dirt road is satisfactory roadway, but under an indifferent policy of supervision this form of road becomes a burlesque. A strip of muck in bad weather is a fair characterization of the average dirt road throughout the corn belt. There is no moral or economic justification for poor roads.

The high hauling costs which now prevail can be reduced by providing three essentials, namely: (a) good roads, (b) economical motive power and (c) efficient transportation and distributing systems. It is not necessary to touch upon the good roads program as there are quantities of information covering all phases of this important subject. Much, however, remains to be said about the two remaining items. The power tractor and the motor truck are destined to revolutionize farm transportation. While the power tractor is rapidly displacing the horse in farm operations, its adaptability as a locomotive in hauling loads to market is not generally known. The progressive farmer, however, is beginning to realize this fact.—Prof. B. W. Bendist, of the University of Illinois.

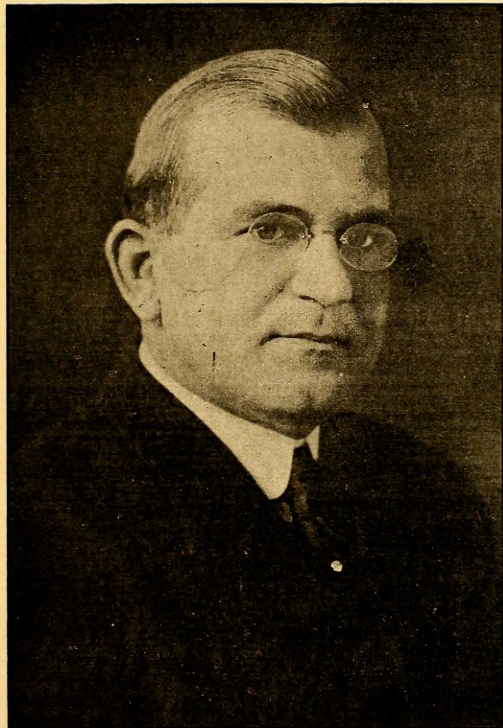
The rich and poor are equally blessed, when they travel over good roads.

The Roads of Wood County, West Virginia

Mr. Burdette Woodyard, county engineer, Parkersburg, writes Southern Good Roads as follows:

At the request of Mr. A. D. Williams, State Highway Engineer for West Virginia, I am sending you under separate cover, some pictures of our permanent roads in Parkersburg District, Wood county, West Virginia. These roads have all been built in the last three years. The roads above referred to are constructed with a 4-inch concrete base, 2 inch sand cushion, vitrified brick

bonds to be used to connect the Parkersburg district roads with the northwestern and Staunton Pikes in their district; these roads to be concrete and 14 feet wide. The 10 miles of brick roads in Parkersburg dis-



MR. BURDETTE WOODYARD

The Efficient County Engineer of Wood County, West Virginia

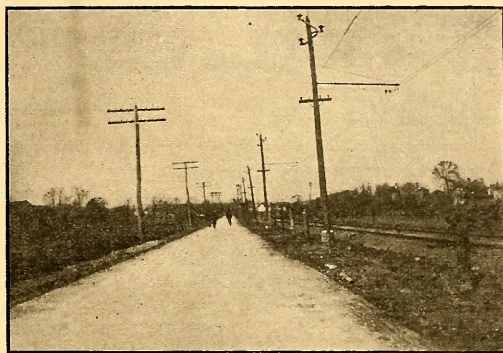
and a cement filler of 1 part cement and 1 part sharp river sand.

We have all four of the main roads leading out of the city of Parkersburg paved in this manner to the district line, making a total of 10 miles.

Williams district, Wood county has just voted \$70,000 to be spent this year to connect the town of Williamstown with the paved roads leading through Parkersburg district, and when the connection is made it will make a road fourteen feet wide and about 14 miles in length. The Williams District work will not be contracted but will be done on force account.

I have been a member of the Wood county court for the past 5 years, having been elected in the fall of 1908. Before I came into the court there was not a mile of permanent road in the county and not a concrete bridge, but now we have many of them.

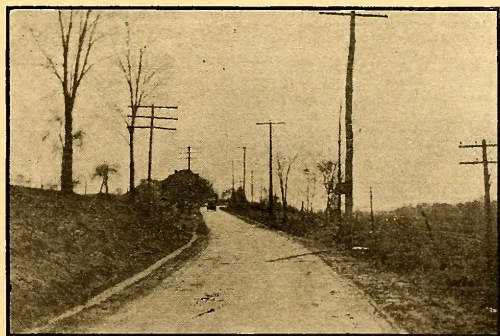
Clay district, Wood county, will vote for \$40,000



Well constructed highway in Parkersburg district, near Parkersburg, West Virginia

trict were built under contract and during the time of their construction I was the president of the court and had supervision over the contractor and gave the work my personal attention.

When Williams district voted the \$70,000 the taxpayers petitioned the court to do this work on force account and also that I resign as president of the court and accept the position of county road engineer,



Macadam Road near Parkersburg, West Virginia

in order that I might have full control of this work, which I did on the 25th day of March, 1914, and I hold that position at this time. I expect to get started on the new work about May 1.

Public sentiment is very strong for good roads all through West Virginia. Besides the roads above referred to we have also built about 7 miles of stone and gravel roads on which we used county prisoners, but we find that they cost too much for up-keep.

A good roads means comfort and pleasure for the autoist; it means the same thing for the farm wagon, with much economy added.

Highway Improvement in Maryland Under Governor Goldsborough

WHEN asked for a statement as to the road work accomplished in his state since his inauguration on January 10, 1912, Governor Goldsborough submitted the following brief summary from the preliminary report of the Maryland State Roads Commission:

On January 10, 1912, Governor P. L. Goldsborough, Cambridge, Dorchester county, was inaugurated, and thereby became a member ex officio of the commission.

On January 25, at the first meeting of the commission after Governor Goldsborough's inauguration, upon his motion, a committee, consisting of Messrs. Clark, Shoemaker and Lloyd, was appointed to make a re-

On April 19 the office of assistant chairman was created, and was filled by the appointment of Mr. F. H. Zouck.

Shortly thereafter a right-of-way department was established, and placed in charge of an expert.

About the middle of May arrangements were consummated for securing the services of Mr. Henry G. Shirley as chief engineer, to succeed Mr. Crosby, resigned. Mr. Shirley had been roads engineer of Baltimore county for eight years, and was exceptionally well qualified for his new position.

On May 22 Mr. W. B. Miller, of Salisbury, Wicomico county; Mr. Andrew Ramsay, of Mt. Savage, Alleghany county, and Mr. E. E. Goslin, of Fedalsburg, Caroline county, were appointed by Governor Goldsborough as new members of the commission, succeeding Messrs. Shoemaker, Hutton and Lloyd, resigned. Dr. Remsen and Dr. Clark were retained on the board as representatives of the Maryland Geological and Economic Survey.

On May 29 Mr. Leon E. Greenbaum, of Baltimore, was elected counsel, succeeding Mr. Benson, resigned.

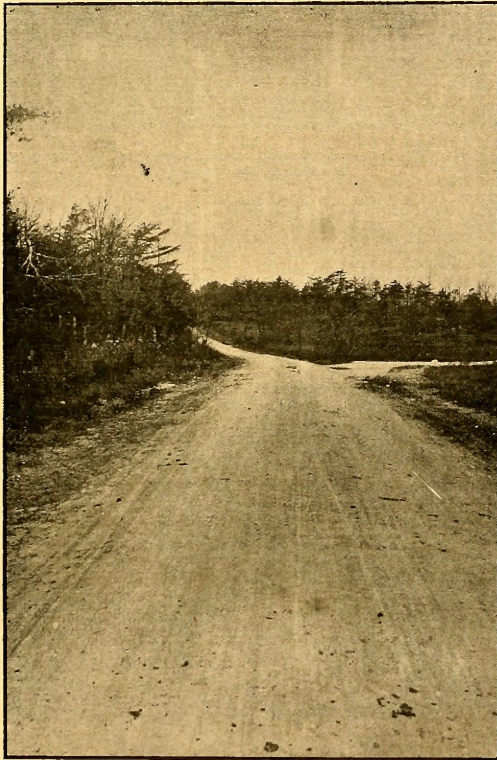
On June 1, after several months of study and investigation, including an examination of the latest methods in use in Massachusetts and New Jersey, a new and modern system of bookkeeping and accounting was installed by Messrs. Haskins and Sells, certified public accountants, of Baltimore, London, New York and other large cities. This system is so simple that a detailed statement of financial operations can be taken off for each month and for the whole period from April 30, 1908, within a very short time. (At the request of the Director of the United States Office of Public Roads at Washington, Chief Engineer Shirley read a paper on this system at the annual meeting of the American Road Congress at Atlantic City on October 3, 1912.)

On June 5 Mr. William L. Marey was elected Secretary, to succeed Mr. Goslin, resigned.

On June 10 the executive offices were consolidated with the engineering department, thus effecting a large saving in expense, besides adding greatly to the working efficiency of the forces.

On June 15 Mr. Shirley took active charge as Chief Engineer, and by his indefatigable efforts soon had a large amount of work going throughout the state.

On August 15 a highly important reorganization of the engineering department was decided upon. Instead of having separate construction and maintenance departments, each covering the whole state, with assistant engineers and engineer inspectors for each of these departments, and using Baltimore as headquarters, thus duplicating inspection trips, increasing traveling expenses and railroad fares, losing a large amount of time in reaching working points, dividing responsibility, etc., these two departments were consolidated into one and the state was divided into eight geographical sections of two or three counties each, with a resident engineer living at a central point in each residency, responsible for all construction, maintenance and state aid work in his territory, and equipped with a motor cycle, so as to enable him to reach all parts of same quickly and frequently. This has saved the state thousands of dollars yearly in expenses and in increased effectiveness. (It is worthy of remark that a board



A Limestone Macadam Road in Prince George County, Maryland. This road is one year old and is surfaced with liquid asphalt. The photograph was taken by the U. S. Office of Public Roads

port of the operations of the commission for the four years of 1908, 1909, 1910 and 1911. This committee submitted a preliminary report on March 1, and published a final report in May of the same year.

On March 1 Mr. O. E. Weller, of Arlington, Baltimore county, was inducted as chairman, vice Mr. Tucker, resigned.

On April 8 the assembly authorized another issue of \$3,170,000 of bonds, to continue the work on the system.



GOVERNOR P. L. GOLDSBOROUGH, OF MARYLAND

of consulting engineers, consisting of three distinguished highways engineers, appointed by the governor of New York several months ago, to make a study and report on the condition of the highways department of that state, has just recommended the principle of this organization for handling the expenditure of \$65,000,000 on their roads.)

On August 20 a purchasing department was organized, requiring written requisition similar to that in vogue with large railway corporations. All supplies, materials, stone, sand, oil, machinery, etc., are bought by a purchasing agent, after approval by the chairman and chief engineer. It is calculated that this has saved the state \$25,000 in sixteen months.

On September 1 the eight new residencies were mapped out and the resident engineers appointed to take charge of them.

On September 10 an equipment ledger was opened with a complete inventory of all machinery and tools. This ledger was put in charge of a special man to check and watch the equipment.

In October the taking of cash discounts on bills was commenced for the first time, by which \$3,300 has been saved in fourteen months.

The practice was begun of assembling the engineering and inside forces at headquarters several times each year for talks on their duties by the chairman, the chief engineer and the resident engineers. These gatherings encourage the men, enable them to interchange ideas and are productive of a better esprit de corps.

The engineering department was classified and placed upon a strictly merit basis, with an assurance of

recognition and promotion for those proving themselves worthy of it.

Active operations were not begun in 1912 until July, when few contractors were in a position to bid on our work, which was further retarded by the process of reorganization during the short working season, but during the year 96.16 miles of new state road were started at an approximated cost of \$906,672.55; 153.92 miles were completed; 138.94 miles were under construction at the end of the year; surveys were made of 372.03 miles, and plans were prepared on 110.12 miles. In the maintenance department 182.04 miles were oiled; 153.92 miles were placed under maintenance, and 4.65 miles were resurfaced or reconstructed.

On state aid work 6.92 miles of new road were let at an estimated cost of \$77,776.36; 8 miles were certified to the state comptroller; surveys were made of 83.97 miles; plans prepared on 16.05 miles, and 8 miles were accepted and turned over to the counties.

The total approximated amount of state and state aid work in 1912 was \$1,529,501.25 (exclusive of \$175,000 paid by the counties,) and covering 307.78 miles of road.

Operations in 1913.

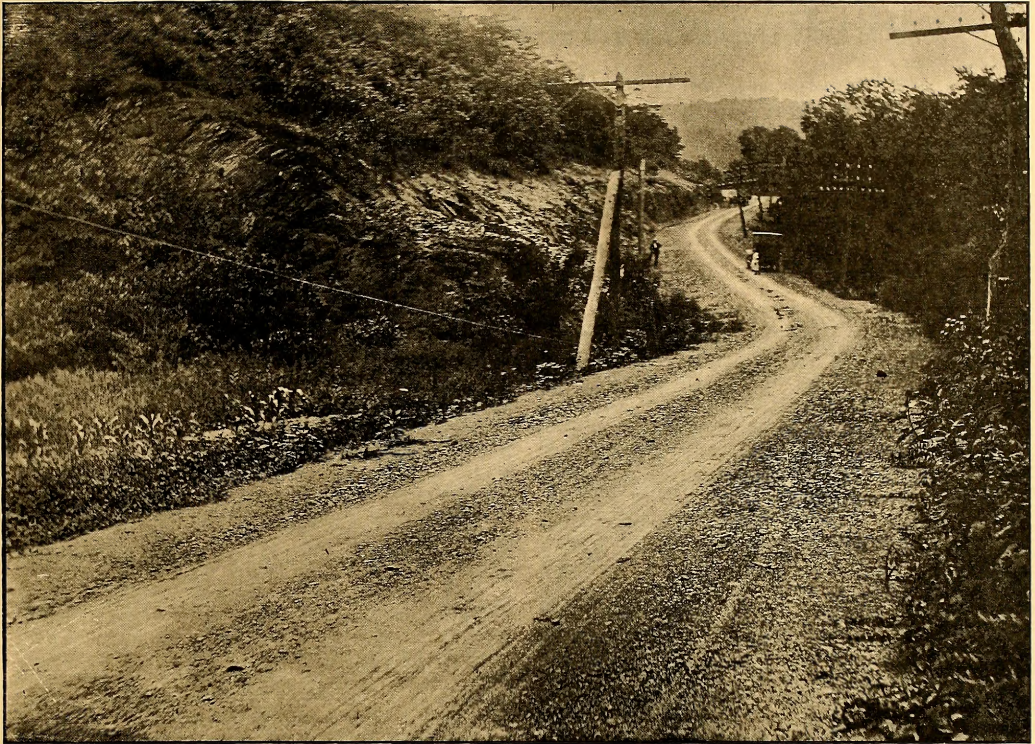
Early in this year a comprehensive reorganization of the office force was put into effect, by which duties and responsibilities were more clearly defined, salaries readjusted, the clerks graded, and a merit system established along lines similar to the engineering department.

A system of monthly reports was inaugurated, showing in detail the financial operations for each month and for the whole period from April 30, 1908.

The specifications for contracts were modified and



A State Aid Oiled Macadam Road near Baltimore, Maryland



Part of a Fine Shale Road on the Green Ridge Highway, twenty miles from Cumberland, Maryland

simplified by Chief Engineer Shirley, after much study, so as to produce less friction with contractors, while amply protecting the interests of the State.

A number of checks and safeguards for payments and estimates, shown by experience to be necessary, were gradually adopted.

Studied attention was given to a steady and progressive development of the maintenance department, more details of which are given later under a separate heading.

A number of superintendents capable of handling by force account work which for various reasons cannot be let by contract were trained or secured, and the results of their work compare very favorably with that done by contractors.

Steps were taken for creating greater interest in some of the counties in state aid work, these including public meetings in Charles, St. Mary's, Calvert, Frederick, Washington and Garrett Counties. This policy, with a more vigorous prosecution of the work, brought the total for the state up to \$267,019.26 for 1913, which, added to the same amount for the counties, would make an aggregate of \$534,038.52, a much larger sum than in any preceding year.

Complete records of the service of all employees were secured and studied, with the object of perfecting the most effective organization possible in the shortest time.

One of the most important accomplishments of the year was in bringing about a more friendly feeling on the part of contractors, whereby more, better and

larger contractors are bidding on our State road work than ever before, these coming from Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Delaware, West Virginia, Virginia and the District of Columbia, besides many from our own state.

The general methods of handling office and engineering details were gradually simplified and better co-ordinated.

The offices of the Commission were removed to more commodious and specially designed quarters in the Garret Building, Baltimore, occupying the whole of the sixth floor.

The effect of these various steps was apparent in a large increase in the amount of work done in 1913.

On the state system, 154.46 miles of new road were begun, at a cost of \$1,700,937.35; 302.42 miles were completed; 90.98 miles were under construction at the end of the year; surveys were made of 372.03 miles, and plans were prepared on 235.79 miles.

In the Maintenance department, 326.61 miles were oiled; 575 miles were maintained, and a total of \$261,379.48 spent for oiling and maintenance.

On state aid work, 54.88 miles of new road were started, at a cost of \$595,718; 18.15 miles were certified to the state comptroller; surveys were made of 94.83 miles; plans were prepared on 69.68 miles, and 18.15 miles were accepted and turned over to the counties.

The total of 366.55 miles of state and state aid work in 1913 approximated \$2,363,905.39, and covered 349.02 miles of road.

Road Work in Maryland

By **H. G. SHIRLEY**

Chief Engineer, Maryland State Roads Commission

THE construction of roads in this state may be divided into three general heads:

1. County Road System—Consisting of county roads constructed and maintained by the county officials alone.

2. State Aid Roads—These roads are built at the expense of the state, taxpayer and the county, the state,



HON. H. G. SHIRLEY

Chief Engineer Maryland State Roads Commission

paying 50 per cent of the cost of construction, the county 40%, and the abutting property owners 10%.

3. State Road System—The roads in this system are built and maintained entirely at the expense of the state.

A total of 1285 miles were laid out as a main arterial state road system, and up to December 31st, 1913, 489.93 miles were completed.

The allotment is made according to county road mileage, and up to December 31st, \$9,170,000 were appropriated, 20% of which went to Baltimore City for paving streets. The remaining portion was spent on the roads of the state.

The last legislature, which just recently adjourned, appropriated \$6,600,000 for continuing the improvement of the state road system, with an idea of filling

in all the main gaps, and of this amount, \$1,600,000 is to be spent for paving streets in Baltimore City, and for building a new Light Street Bridge across the harbor, while the remaining \$5,000,000 will be spent for the construction of roads in the state. With this amount, we estimate that 525 miles of road can be built. Considering, therefore, the amount already completed and the amount contemplated, we figure that approximately 1,000 miles shall have been completed by December 31st, 1915.

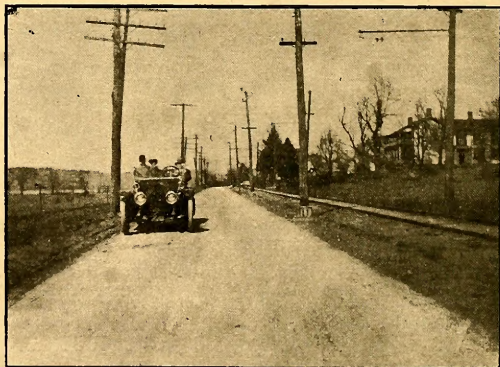
The types of road being built by the state vary from sheet asphalt, brick, or granite block, required for the heavy traffic of the city streets, to the shale and sand-clay roads of western and southern Maryland, respectively. On the roads where the traffic is very heavy, and more especially where there is considerable motor traffic, concrete or bituminous concrete roads are being constructed, and up to date about 65 miles of concrete road have been completed, and as many more miles are now under contract.

The maintenance fund for the upkeep of our state roads consists of the 1c. direct state tax and a portion of the automobile license fees. We are now maintaining about 700 miles of road, and have just let a contract to oil 425 miles of road, using approximately 1,450,000 gallons of oil.

We are very much gratified at the results secured in building concrete roads, and in many instances they were built as cheaply as macadam.

I regret exceedingly that owing to the rush of work, I am unable to go deeper into this big, broad, and interesting subject, but hope that sometime in the future I shall be able to find time to write for Southern Good Roads an article describing more fully the work we are doing and the work we contemplate.

The third annual convention of the National Old Trails Road Association to be held in Indianapolis, Ind., May 7, 8 and 9, promises to be the most important



A fine Macadam Road near Parkersburg, West Virginia

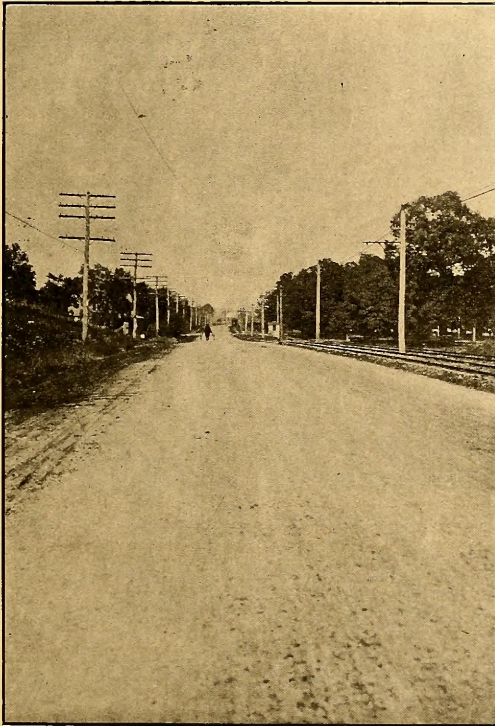
event in the history of the good roads movement and, according to the most conservative estimate, 5,000 delegates will attend.

Types of Maryland State Roads

PERHAPS no other state has a wider diversification of road conditions than Maryland, this including crossing the Alleghany Mountains in Garrett and Alleghany counties; the smaller ranges of the Blue Ridge east of there; the broken and hilly region of Cen-

tral Maryland, with its variety of soils; the sandy Eastern Shore counties, with no road-building material, and in cases with tidewater only a few inches below the surface; the broken and irregular sand and clay country of Southern Maryland, with no stone, many rivers and swamps, and scant transportation facilities; the expenditure of several million dollars in paving city streets in and around Baltimore, with a population of nearly three-quarters of a million; the designing and construction of a number of large bridges, etc.

the stone roadbeds being resurfaced with five or six inches of new hard stone, thus making a road which compares very favorably with our standard macadam. In 1912 contractors would not bid on this class of work except on a percentage basis, but a plan has been devised whereby a large mileage has been built by contract on a unit basis in that section in 1913. Near Green Ridge, in the mountains east of Cumberland, where the cost of hauling in a stone suitable for macadam would be excessive, seven miles have been built of shale, which is found in quantities in that vicinity. This makes a smooth and comparatively inexpensive highway, similar to that through the Delaware Water Gap in Pennsylvania. It is not costly to maintain and



A sample of Baltimore County's fine Bituminous Macadam Roads.
This is one near the city of Baltimore

tral Maryland, with its variety of soils; the sandy Eastern Shore counties, with no road-building material, and in cases with tidewater only a few inches below the surface; the broken and irregular sand and clay country of Southern Maryland, with no stone, many rivers and swamps, and scant transportation facilities; the expenditure of several million dollars in paving city streets in and around Baltimore, with a population of nearly three-quarters of a million; the designing and construction of a number of large bridges, etc.

In carrying out this great undertaking the Maryland State Roads Commission has given close study to adapting the types of roads, as far as is consistent with a system of modern highways, to the resources of the state, and to the physical characteristics, the traffic requirements, and the wishes of the people in the several parts of same. As a result, these vary from sand-clay roads in Southern Maryland to the highest class of street improvements in Baltimore City.

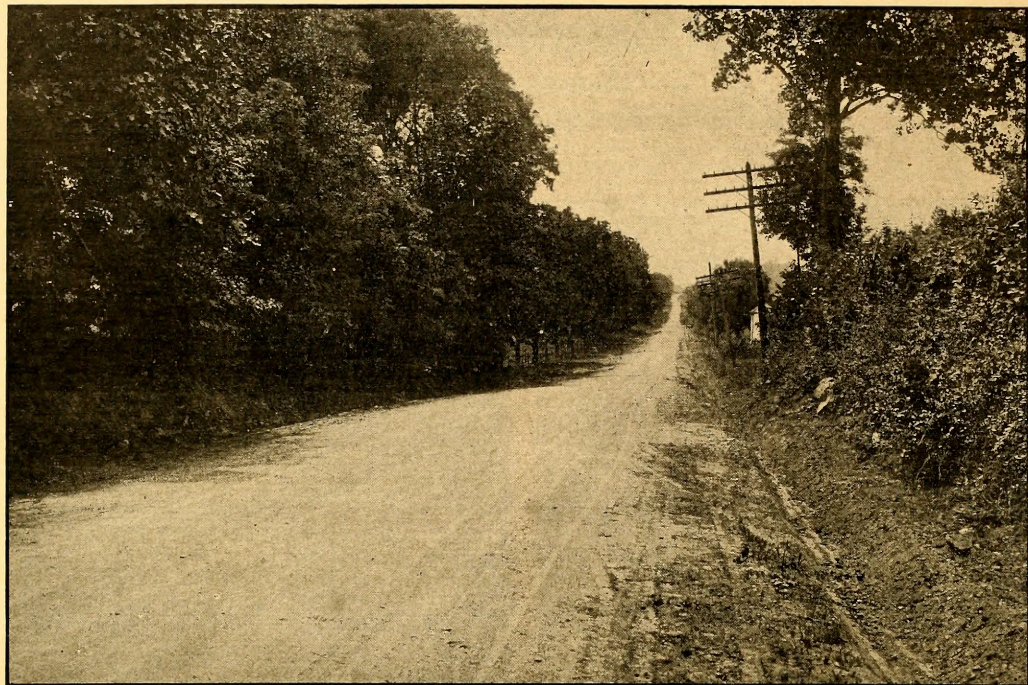
In Western Maryland, says the report of the commission, operations are largely confined to macadamizing the old National, Frederick and other turnpikes,



An unimproved road near Seneca, Maryland

is soft only in the wet spring months, when it is little traveled.

In Southern Maryland macadam roads are expensive to build because of no stone and poor means of transportation, and public sentiment there prefers gravel or sand-clay roads, with a larger mileage for the same money. When the proper combination of these materials can be had, these highways meet the present traffic demands of that section fairly well, especially if rolled when laid. Pains have been taken, and considerable expense incurred, in 1912 and 1913 to relocate and shorten these routes; to take out the many small curves of the old roads; to reduce the heavy grades on



Finished Macadam surface before bituminous treatment, near Rockville, Maryland

the clay hills in some instances from 20 per cent. to 4 per cent., and to otherwise improve and give these thoroughfares character. Where the right kind of gravel and sand can be found at a reasonable cost, some concrete is being laid on the main routes in this section.

In central and eastern Maryland standard 8-inch macadam is being chiefly used, where concrete cannot be laid to better advantage. On the Eastern Shore, where the conditions are favorable to water-bound macadam roads and where they have been unusually well constructed, oiled and maintained, some of the finest roads of this character in the country can be found, many of them being in better condition at the end of three or four years than when first built. However, macadam roads are expensive to maintain at the best, and it is absolutely essential that they be built of the highest grade material and that they be treated every year or two with a heavy oil to protect them from the ravages of motor traffic.

In Baltimore City and its suburbs our construction has included vitrified brick pavements, granite blocks, bituminous concrete and asphalt. The specifications have followed closely the standards used in other large cities, and these improvements have been along the most advanced lines.

Several short sections of bituminous or pitch macadam were built by the present Commission in 1912, but proved so unsatisfactory that no more construction of this character has been undertaken.

Oyster shells have been found unsuitable for modern state roads, and are not being used, except in one or two cases as the first or bottom course for a stone macadam surface.

The cost of maintaining macadam roads under the ever increasing strain of heavy and fast automobile

motor truck and steel tire traffic early prompted Chairman Weller and Chief Engineer Shirley of the Maryland State Roads Commission, to make a careful study and investigation of concrete roads, this including a personal examination of those in Wayne county, Michigan, in which the city of Detroit is situated. This led to the laying of several sections of concrete in the summer and fall of 1912, namely, three on the Washington Boulevard, at Bladensburg, at Paint Branch, and in Laurel; a short stretch in lower Charles county, and on the treacherous clay soil of the Old Post Road, east of North East, in Cecil county. These roads have now been under heavy traffic for more than a year, and are practically as good as when laid, with no maintenance on them, except for shoulder work. Encouraged by this, the Commission in 1913 added 55 miles of concrete to its construction, this being scattered in Baltimore Carroll, Cecil, Caroline, Charles, Dorchester, Howard, Montgomery, Prince George's, Somerset, St. Mary's, Talbot, Wicomico and Worcester counties under widely varying conditions.

Concrete is a new type of road, and great care and attention must be used in building it. Nearly all its failures can be traced to inferior construction, rather than to the strain of traffic. Only good clean stone or gravel, the best sand and the highest quality of cement, should be used. It is not less important that it be properly mixed, laid and cured. None of its details can be overlooked. But if the ingredients are properly selected, and the mixing is thoroughly and intelligently done, the road will stand the heaviest traffic, with a small maintenance charge.

Building concrete roads is new to contractors, and their first effort is naturally not as good as is desired. But they learn very quickly, and, with experience, bet-

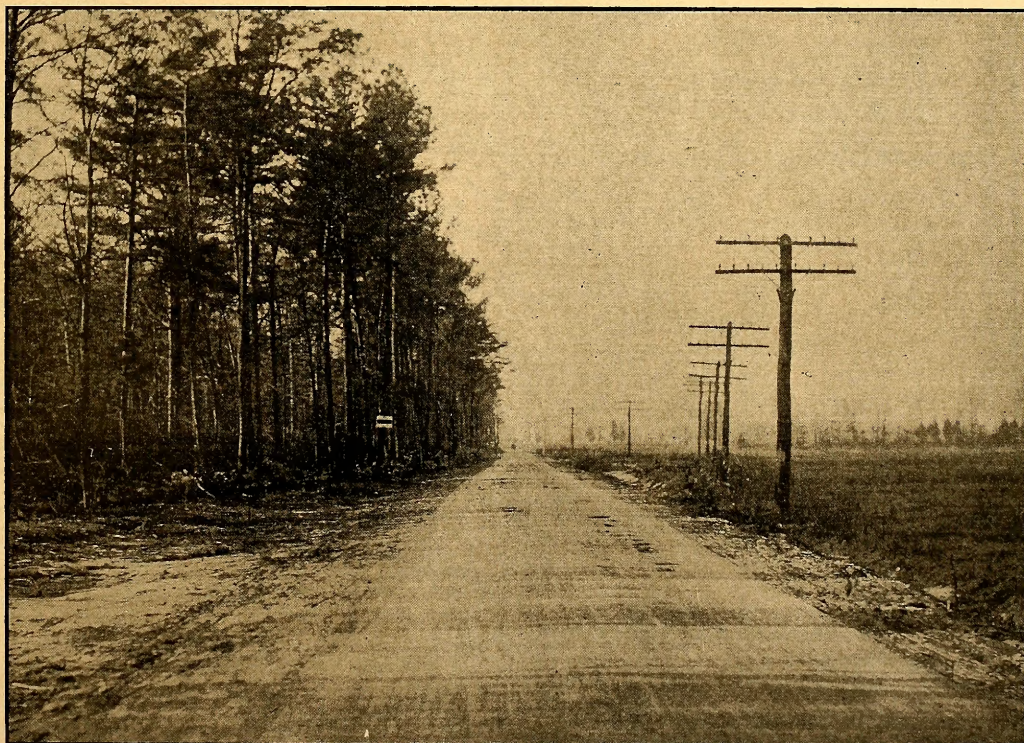
ter organizations and improved mixing machinery, they are already putting down concrete for us more rapidly, and, in some instances, more cheaply, than macadam. By asking for alternative bids on macadam and concrete, the commission has been obtaining the lowest and comparative prices on each. Bituminous concrete was included in our last advertisement, resulting in a very gratifying bid of less than \$12,000 per mile for a 14-foot road in Dorchester county. This is nothing less than a smooth high-grade city pavement, with a 2-inch mixed asphaltic stone top, and probably little or no maintenance for a period of five or more years. This pavement is now being used practically only in cities because of its high cost, but we anticipate that when contractors generally learn how to lay this type of road, and are brought in sharp competition with each other on it, they will greatly reduce their prices, as has been the case on plain concrete. This innovation gives bright promise for the near future.

Among the many advantages of concrete roads, and particularly as compared with macadam, may be mentioned the following: The small cost of maintaining them; their durability; their smoothness when properly laid; less dusty without oil; their non-susceptibility to damage from washouts from heavy rainfalls; they can be built more rapidly; they do not ravel before being oiled; they require less labor; they have a longer season for building; contractors prefer, and will bid closer on them; they are more sanitary; sometimes a local stone of the requisite hardness and toughness for concrete, but which has not the binding qualities, can

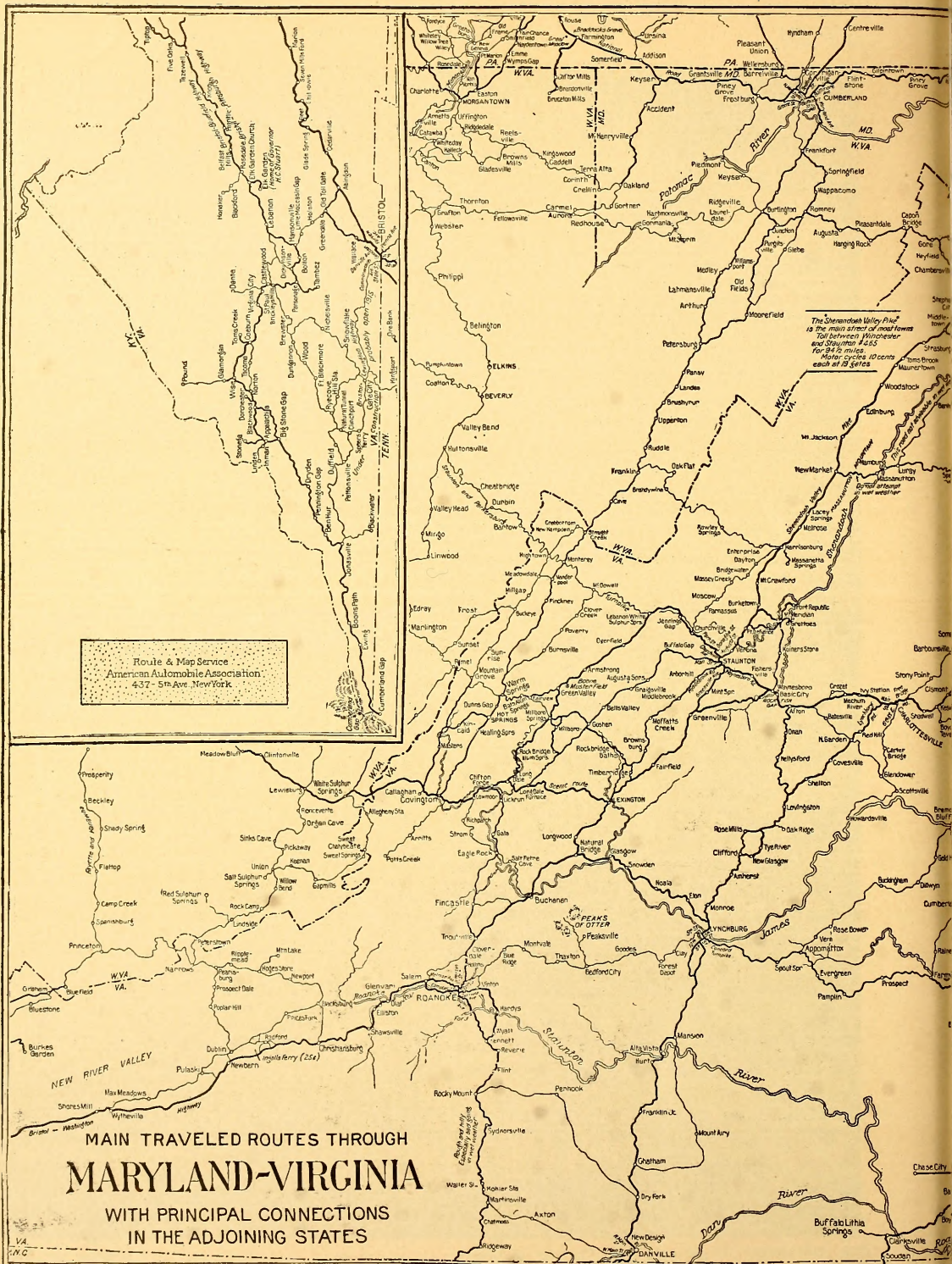
be used at a much lower cost than stone imported for macadam; soft spots in the sub-base affect them less; and, in the long run, and even now in some cases in the first instance, they can be built cheaper than macadam. Among their disadvantages are: The cracks caused by expansion and contraction, which are unsightly when patched with tar, but which are not visible when the concrete is covered with a top; the difficulty of repairing them, if the bond should be badly broken; and their so-called non-resiliency, although we have never had a complaint about them on this score. However, these disadvantages are being rapidly overcome, and we feel that ere long they will be eliminated.

The Commission has proceeded conservatively in taking this forward stride, and believes that it has not been a mistake, but that it has made a distinctive gain in the science of modern highway building. Unless some unlooked for defects develop in the concrete roads already built, this type of construction will be more extensively adopted and developed in the years of 1914 and 1915.

Announcement is made that R. R. Boyd, assistant state highway engineer of Alabama, has let a contract for the construction of four and one-half miles of good roads in Coosa county, between, Kellyton and Rockford. Mr. Boyd was in Coosa county recently in conference with the board of revenue. Construction of the road will begin immediately. Mr. Boyd will also let a contract for a state-aid road in Hale county soon.

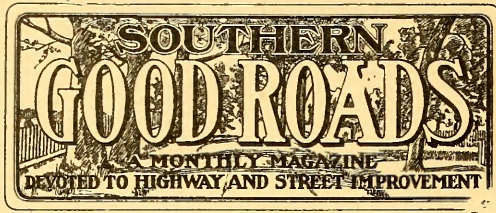


Beautiful Concrete Road near Cambridge, Maryland, covered with Tarvia. The picture shows relocation. The present road crosses the old line 6 times in 3-4 of a mile



The above cut is a much reduced facsimile of the Maryland-Virginia map just issued by the A. A. A. Touring Information Bureau. On map of Baltimore. The original approximately four times as large as this reduction, and printed on tough bond paper to

Courtesy American Motorist



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No. 5.

WEST VIRGINIA AND MARYLAND.

This issue contains fine full page pictures of two strong friends of the good roads movement, Governor Hatfield, of West Virginia, and Governor Goldsborough, of Maryland. We carry an excellent story of the good roads work that has been done in Maryland under Governor Goldsborough but our West Virginia correspondents failed to send us any extended account of Governor Hatfield's good roads activities. Suffice it to say that no Southern governor is a more consistent, more earnest, or more enthusiastic advocate of good roads than Governor Hatfield. He was largely instrumental in re-establishing West Virginia's state highway commission and he has recently issued proclamation setting aside May 28 and 29 as "Good Roads Days." He is a high type of efficient, working executive.

This issue of Southern Good Roads, while it contains several other features of interest, is devoted largely to the road situation in West Virginia and Maryland. We hope that it will prove helpful and entertaining to our many readers in these two states especially, and to our readers in general.

Next month we will devote considerable space to

North Carolina, and with the assistance of the state highway officials and others, we expect to produce an unusually fine number.

THAT BORDER HIGHWAY.

Now that war with Mexico is threatened and Mexican banditti are menacing the lives and property of American citizens all along the border, the need of that "Border Military Highway," of which Mr. Mason Maney wrote so interestingly in these columns last month, is very apparent.

If, instead of engaging in an endless talk-fest when matters of such importance as this are brought before it, our national congress would get busy and do something, we would not be in a continual state of unpreparedness. The highway has long been regarded as a necessity and it should have been built years ago.

As matters now stand, it is hard to protect the lives of our people who live along the Rio Grande. The trails that exist in those regions make the movements of even small bodies of troops exceedingly slow. With a good highway the border could be patrolled efficiently with a comparatively small body of men.

We hope that our Texas friends will keep up their fight. They are entitled to the protection for which they ask and should have it.

COMING OUR WAY.

It gives us no little pleasure to be able to announce to our readers that Florida, Georgia, West Virginia and Tennessee have joined our happy family. Southern Good Roads is now the official journal of the state road organizations of these four states and of Virginia, North Carolina and South Carolina.

As soon as it can be arranged for, these four states will have certain sections of the magazine set aside for them and a competent good roads man will furnish items every month for each of these states.

We are very proud of the new friends that we have made of late and we hope to be of service to them. Our columns are open to the members of all of these state organizations and we hope that they will make use of them.

Eventually we hope to cover the entire south and to become the official organ of the state good roads associations of the 16 southern states. It is our purpose to make the magazine helpful to every good roads advocate in the South and to do that we realize that we must get close to the people through their own road organizations.

We desire a big circulation, of course. All publications desire that, but far more than that we desire to be a force for the up-building of the South. We would help the struggling friends of progress in every backward county in the South, if we could, and it is because we are getting close to the people through these fine working organizations that we rejoice most.

We have worked hard to attain our present position. It is no easy task to start as a small, unknown publication and in a short four years gain recognition so uni-

versal that associations of high character and standing recognize you as the leader in your field. Naturally, we feel very proud of it and at the same time we realize that the responsibilities resting upon us were never so great.

We promise our new friends that we will serve them to the best of our ability and we beg that they assist us in every way possible. If our magazine is to render its best service to the associations for which it stands, the individual members of these associations must help.

The Washington-Atlanta Object Lesson Highway.

All the county and municipal authorities along the route of the great highway from Washington to Atlanta, Georgia, have consented to the arrangement whereby the government is to supervise the maintenance of the road for a period of not less than one year as a national object lesson in scientific and economical management and maintenance. This announcement was made by J. E. Pennybacker, Jr., executive secretary of the American Highway Association, under whose auspices the experiment is being made.

Mr. Pennybacker, returning from Atlanta at the conclusion of the government's scouting trip, brought encouraging reports as to the unanimity with which all the county officials agreed to turn over their funds and their authority over the roads in their territory to the engineers named by the government and this is considered ample vindication of the experiment in uniform maintenance.

At every city along the route the government party was greeted by high state, county and city officials. Some cities sent out parties of automobiles to meet the scouting party 100 miles distant from the city, returning as part of the procession. Mayor Woodward of Atlanta and fifty leading officials met the party at Stone Mountain and escorted them to the city. At Athens, Georgia, the procession included one hundred automobiles and extended over a mile of roadway. At Atlanta there were fifty automobiles in line.

The great rivalry between the various towns as to whether the road from Washington should go by the Athens route or by what is known as the Georgia railroad route was settled by the diplomatic decision that both of the routes should be used so that travelers might take their choice. The Athens route is about 175 miles to Atlanta and the Georgia railroad route slightly shorter, but both roads will be improved and maintained by the government as part of the Washington to Atlanta highway.

Mr. Pennybacker stated that the Office of Public roads had already assigned the engineers who will take charge of the work and supervise the expenditure of the funds turned over by the state and local officials. Engineer George C. Scales, will take charge of the southern part of the road, engineer W. L. Spoon the middle division, and engineer D. H. Winslow the northern end, each covering about 300 miles.

The experiment is expected to be an excellent test of co-operative action and to show what can be done by the states themselves in the way of establishing national highways which will benefit not merely the communities along the route, but the country generally.

It was the American Highway Association, through its chairman of the committee on maintenance, Leonard Tufts, Pinehurst, N. C., which suggested the experiment, and this organization has already placed at the disposal of the government engineers the automo-

biles with which they will cover the stretches of road under their jurisdiction.

The road is expected to be in excellent shape and ready for the tourists who will attend the great American Road Congress to be held at Atlanta, the week of November ninth. This congress combines the conventions of the American Highway Association, the American Automobile Association and their allied state and county organizations.

COMING CONVENTIONS.

- * North Carolina Good Roads Association will meet at Durham, July 8-9.
- * Southern Appalachian Good Roads Association will meet at Bristol, Va., Tenn., October 6, 7, 8 and 9, 1914.
- * American Highway Association, Atlanta, Ga., November 9 to 14, 1914.
- * American Road Builders' Association, Chicago, Ill., December 14 to 17, 1914.

A. A. A. Announces Annual National Reliability Tour.

June 29th is the day selected for the start of the National Reliability Tour of the American Automobile Association, which this time will be in the form of a day and night non-motor stop run from Chicago to Boston. Managed by the Chicago Automobile Club, the run will be under the direct supervision of the A. A. A. Touring and Contest boards; and Chairmen Frank X. Mudd and Richard Kennerdell have jointly agreed upon the conditions governing this quite unique contest.

The contest board has provided a stock car definition which will call for registration of the different models by the manufacturers, and this will require number of cylinders, bore, stroke; make and model of magneto; make, model and size of carburetor; tire sizes, wheel-base, and such equipment as starters, lighting, wheel absorbers, horns, etc. The stock car definition is a simple registration not requiring the technical committee to visit factories.

The contestants will be divided into three classes. One will be for stock cars listing over \$1200, for which the prize will be the Glidden Trophy; another for stock cars listing under \$1200, with the Anderson Trophy going to the winner; and a third class of non-stock cars entered by private owners with the possession of the A. A. A. artistic touring trophy as the incentive. Certificates of merit will be awarded to every competing car finishing the run without stoppage of the motor.

The run will require approximately 65 hours, starting from Chicago at 2 o'clock, Monday, June 29th, and reaching Boston at 12 o'clock on July 2nd. The schedule calls for 20 miles per hour between sunrise and sunset, 15 miles per hour between sunset and sunrise the first night, and 18 miles per hour between sunrise and sunset the other nights. Controls will be established at Bryan, O., Cleveland, Buffalo, Syracuse, Albany, New York City, Springfield, and Boston.

With Boston as the conclusion of the run, that city will be a popular rendezvous for many motorists who will participate in the A. A. A. mid-summer gathering which will take place in the White Mountains. This latter event calls for assembly at Bretton Woods on the morning of July 4th, and from the great amount of interest already taken in both events, it is a certainty that they will prove quite notable in the season's motor calendar.

Proceedings of the Georgia Road Commissioners Convention

The first convention of the Georgia Association of County Commissioners was held at Atlanta, April 15 and 16. The convention was called at the instance of a number of the leading county commissioners of the state by the Atlanta Convention Bureau for the purpose of discussing a number of important problems, among them being the question of legislation and its effect on county affairs; the question of government aid in the building and maintenance of roads; the State Highway Commission as a tentative proposition; the handling and care of convicts; the coming of the American Road Congress to Atlanta, with 5,000 delegates, next November; the fund of \$771,000 a year apportioned to the state of Georgia by the national government, and the problems of the government experts now going over the ground from Washington to Atlanta along the National Highway.

The morning of the first day was devoted mainly to registration of delegates and perfecting the plans of organization. Mayor Woodard delivered the formal address of welcome in the afternoon and the convention got down to business immediately. There were strong addresses by Hon. W. S. Keller, state highway commissioner of Alabama, Dr. Joseph Hyde Pratt, state geologist of North Carolina, Dr. S. W. McCallie, state geologist of Georgia and others.

Wednesday evening at Hotel Ansley the assembled commissioners were tendered a banquet and speeches were made by Governor John M. Slaton, Mr. J. E. Pennybacker, secretary of the American Highway Association, Mr. Charles P. Light, business manager of the American Road Congress, Lewis R. Ferguson, of Philadelphia, and others. Mr. W. T. Winn, of Atlanta, was toastmaster.

The papers presented were of very high order and some of them will be published in Southern Good Roads.

Feeling the need of a publication through which the association can act and speak to the people of Georgia, the association adopted Southern Good Roads as its official organ. The resolution concerning this follows: "Resolved, That the Association of County Commissioners of Georgia adopt the monthly publication known as Southern Good Roads and published at Lexington, N. C., as the official organ of the association and we commend this magazine to those interested in good roads in this state."

The resolution was adopted unanimously by a rising vote. Mr. H. B. Varner, editor of Southern Good Roads, who was present, placed a section of the magazine at the disposal of the association and Secretary Fred Houser was designated to handle the Georgia page.

The organization was completed Thursday with the election of the following officers:

W. T. Winn, of Atlanta, president; John A. Smith, of Hall county, first vice president; T. H. Adams, of Polk county, second vice president; Fred Houser, of Atlanta, secretary and treasurer.

The board of managers from each congressional district was chosen as follows: First district, B. E. Dowdy, of Tattnall; Second district, A. T. Jones, of Mitchell; Third district, J. M. Lewis, of Macon; Fourth district, L. A. Scarboro, of Muscogee; Fifth district, Shelby Smith, of Atlanta; Sixth district, J. D. Moore, of

Clayton; Seventh district, B. B. Branson, of Bartow; Eighth district, E. M. Williams, of Walton; Ninth district, W. J. Tribble, of Gwinnett; Tenth district, B. B. Monday, of Columbus; Eleventh district, A. P. Miller, of Montgomery; Twelfth district, C. T. Beacham, of Laurens.

The legislative committee was chosen as follows, one from each district in the order named: A. P. Bacon, Chatham; ——— Griffith, Decatur; W. H. Gardner, Macon; J. C. Butt, Marion; R. J. Freeman, DeKalb; ——— Kell, Paulding; W. J. Headden, Cobb; J. R. McElroy, Clarke; J. A. Robertson, Habersham; G. W. Lokey, McDuffie; G. N. Matthews, Montgomery; J. E. Newby, Twiggs.

It was decided by the committee that the active members of the association should be the commissioners of the various counties and where there are no commissioners the members should be the ordinaries of those counties.

It was announced that the legislative committee would draft a bill providing for a state highway commission and present it at the coming session of the legislature and that it would also prepare a bill incorporating the association and providing that the counties pay the expenses of delegates to the annual convention.

Good Roads Convention, Macon, Ga., May 20.

The good roads committee of the Georgia Chamber of Commerce, of which Emory Winship, of Macon, is chairman, is at present centering its efforts on the meeting of the good roads convention in Macon during the Georgia Jubilee celebration. The tentative date set for the good roads convention is May 20.

Secretary T. B. Slade, of the committee, who is a paid employee of the state chamber, has been writing to county road commissioners, road building experts and manufacturers of road building machinery enlisting their attendance and co-operation in the coming convention and the response has already been better than was expected.

Two of the principal matters to be discussed at the convention will be the plans for formulating a system of improved highways throughout Georgia and the building of a model highway between Macon and Columbus. Chairman Winship some time ago announced that it was the intention of his committee to make a statewide automobile tour in the interest of better highways, but this trip has been postponed until after the convention in May. Details of the tour will be mapped out at that time.

In an account of the visit of a body of Chicago men to Lexington, Kentucky, appeared this interesting good roads item: "The good roads enthusiasts of the delegation were impressed with the fine highways at the hub of Kentucky's famous system of turnpikes. These were developed through seventy years of effort and supplemented by interurban electric lines and steam railroads. Lexington has established itself as the civic center of one of the richest and most highly developed farming communities in the country. Good roads enable Lexington to dominate the trade and commerce of nearly 200,000 people."

A wise man loves a smooth road.

The Recent Meeting of the Georgia Road Commissioners

By C. M. STRAHAN

Head of Good Roads Department, University of Georgia

THE recent meeting of the Georgia Road Commissioners in Atlanta brought together more than 150 delegates representing about fifty counties. The meeting was an interesting one. The features of the occasion as already given by the public press were:

1st. Steps to perfect a strong organization of the county road authorities into a permanent association supported by county membership paying small annual annual dues.

2nd. Interest and enthusiasm in the meeting of the American Road Congress which will meet in Atlanta next November.

3rd. Strong sentiment expressed by resolution looking to the establishment of some type of State Highway Department to handle broadly the state road problems including the questions of state and national aid as they may develop.

4th. The delightful social occasions whereby the delegates became so well acquainted and wherein the Fulton Commissioners and other friends proved such admirable hosts.

5th. The current of discussion and comment showing the wide-awake measures which commissioners and wardens are carrying forward in each county represented.

The Good Roads Department of the University desires to call special attention to the American Road Congress meeting in November and to translate in words the spirit of progress which was so manifest among the delegates.

The American Road Congress.

Every road commissioner and every city councilman and every engineer in Georgia and the surrounding states should not fail to understand the importance of the American Road Congress meeting for next November which, through the well directed energy of the Fulton Commissioners at Detroit, was induced to hold its 1914 meeting in the South and in Atlanta.

Any one who attended the Detroit session with its 4,000 interested delegates from all over the United States and Canada, with its 30,000 square feet of material and machinery exhibit, with its full co-operation of the Office of Public Roads, cannot fail to feel the educative value of this mammoth gathering and the distinct compliment and opportunity involved to Georgia.

Any one who knows Mr. Chas. P. Light, the splendid organizer and human dynamo who has charge on behalf of the congress of the coming Atlanta meeting, and Mr. J. E. Pennybacker who in behalf of the Office of Public Roads has promised a special degree of assistance to the Atlanta meeting can not doubt for one moment that next November will see 5,000 delegates on hand and the most complete display of road making material and equipment ever assembled in the country.

No Georgia road or street official can afford to miss this notable gathering and the instructive exhibits which will bring together the membership of more than twenty-seven of the largest national and sectional road associations, and all the road officials from highest to lowest of each state of the union, and for which business men freely expend many thousands of dollars in

order that a complete display may be made of every thing which the road and street builders can need.

The American Road Congress is not the advocate of any special highway project or type of road. It seeks to serve as a great clearing house of road ideas, of road equipment and of road materials where annually every one interested can come and see what is being done in every phase of road and street construction. We do not hesitate to advise our Georgia people and business men to give a hearty support to this meeting. Its inspiration will be felt in a thousand ways upon Georgia's road progress both in city and country.

Evidences of Progress.

The enthusiasm and discussions of the delegates was the best evidence of the strong forces at work for specific road betterment in the several counties represented. It is clear after six years of the convict law and of awakened road enthusiasm that not only a few but practically all of the counties have grasped their road problems by the right handle under present economic conditions, and are studying and using the best local soils and gravels for road surfacing with ever increasing intelligence and ever better results. The true worth of top soils and sand clay mixtures when properly selected and intelligently consolidated has been abundantly proven in nearly every county.

The contagion has spread from county to county. These low grade materials are universally recognized as the immediate type of road surface betterment in reach of every county. The cost is low, running from \$300 to \$600 per mile; construction is rapid, easily done with convicts, requiring only a moderate equipment; maintenance is cheap with road drag and machine; the traffic is not suspended during construction but is the main factor in consolidating the road bed; and the results are both durable and satisfactory to all forms of existing traffic. Best results come from consolidation in wet weather. Very important to keep the surface shaped as it packs down.

The commissioners give great credit to the men who are on the firing line, namely, the wardens and foremen. They assert that experience acquired by long service, carefully planned road policies consistently carried out, wise selection of machinery and equipment, employment of engineers for difficult problems are all important factors in the progress made. They emphasize the necessity of frequent, ample, and permanent water ways of terra cotta and concrete and that bridge problems should be solved for much heavier loadings than were customary six years ago.

Certain broad principles seem to have been formulated in the minds of the commissioners as the outcome of experience:

1st. Wise and sustained road building requires that the road shall easily bear the traffic, but not cost more than the traffic will easily bear. Fully understood, this statement is a compendium of road philosophy from either the engineering or the sociological viewpoint.

2nd. Road betterment must proceed by gradual steps in efficiency affecting large mileage rather than by huge jumps in the efficiency of small mileage. Con-

tinuous public support is dependent on the rapidity of construction, whereby a majority feels that returns are coming in from the investment made.

3rd. That an improved surface is the most vital single factor in making efficient roads, without which grading and relocating lose much of their value. Hence the deep interest in the behavior of cheap local materials and the importance of knowing how to select top soils and sand clays for road surfaces.

There is great cause for congratulation to the state, that such sound ideas have become so widespread; and that so many agencies are intelligently studying and using the local materials at hand.

This department has been advocating these ideas for a long time and our laboratory is at the service of the people of Georgia in examining free of cost any samples they care to send. We are also ready to help them with their bridge designs and other engineering problems.

The 1914 Good Roads Year Book.

Funds available in all of the states for the improvement of roads during the year 1914 are shown in the Official Good Roads Year Book issued by the American Highway Association, which is now ready for distribution. This is one of the new features of the book which will make it invaluable to every state, county and municipal highway official.

The Year Book discloses for the first time that appropriations by the state legislatures for road improvement in the various states are available as follows:

Alabama, \$700,000; Arizona, \$535,724; Colorado, \$375,000; Delaware, \$110,000; Idaho, \$275,000; Illinois, \$1,300,000; Iowa, \$7,310,000; Kentucky, \$25,000; Maine, \$1,540,000; Maryland, \$3,700,000; Massachusetts, \$2,447,315; Michigan, \$4,183,972; Minnesota, \$5,672,254; Mississippi, \$1,720,000; New Jersey, \$750,000; New Mexico, \$387,194; New York, \$6,000,000; North Carolina, nearly \$5,000,000; North Dakota, \$2,365,000; Ohio, \$3,500,000; Oregon, \$3,288,000; Pennsylvania, \$3,500,000; South Carolina, \$1,000,000; Virginia, about \$2,000,000; West Virginia, \$2,286,557; and Wisconsin, \$1,230,000.

These interesting figures have been obtained from the officials of the various state highway departments and form merely one chapter of the year book, which covers every phase of the road movement in the United States. The year book lists all of the patents relative to roads and bridges, all road expenditures in recent years, all associations' work for road improvement, describes all the different methods of road construction and different road materials, giving a directory of all road bulletins, circulars, and documents of interest to persons working for better highways and for all officials engaged in supervising work on roads.

Sections of the year book are devoted to work in different states and the progress of road improvement. Engineers actually engaged in building roads as well as public spirited citizens who are working for better roads in the various communities have been waiting for the issuance of this volume by the American Highway Association and will find many features in it which do not appear in last year's edition. One of the interesting features, for instance, is the description of dust preventives, while one chapter is devoted to convict labor and another to the financial phase of road improvement.

A summary of the road laws in the various states is of particular interest to motorists, while descriptions of specifications for highways in the various states will be of interest to engineers. There is also a chapter de-

voted to important events in the road movement in 1913, and another section devoted to road systems in foreign countries.

The year book is issued annually by the American Highway Association as part of its campaign to give the United States an adequate system of improved highways.

The year book sells for \$1.00 per copy, postpaid, and it should be in the library of every good roads advocate and every good roads official in the nation. Mr. Charles P. Light, formerly state highway engineer of West Virginia, is business manager and Mr. J. E. Pennybaecker, Jr., secretary of the American Highway Association, is editor.

Maryland Road Commission Wins Against Pennsylvania Railroad.

The Inter-State Commerce Commission last month handed down an opinion that will be of considerable interest to those living along the lines of the Pennsylvania Railway who are interested in road-building. The opinion prohibits the Pennsylvania Railroad from increasing its freight rates on crushed road-building stone from the quarries of Pennsylvania and Maryland to the Eastern Shore of Maryland and Delaware.

The action against the Pennsylvania was brought by the state of Maryland. The proposed rates provided for an average increase of 15 cents a ton. It is estimated by the commission that the increased rates would have added between \$500 and \$600 per mile to the cost of road construction on the Eastern Shore.

The commission points out that the ton-mile earnings on road stone, under the present rates, are nearly the same the Pennsylvania system has earned on other commodities. It also says that the present rates are not abnormally low when compared with rates on like traffic via other lines for substantially similar hauls in nearby territories.

"It requires from three thousands to four thousand tons of crushed stone to construct a mile of standard road," says the opinion. "The average total cost of construction under the freight rate adjustment in effect since 1908 has been about \$10,000 a mile. As the stone is purchased free on board at quarries, an increase of 15 cents per ton in the rates would mean an increased construction cost of about \$500 to \$600 per mile of road. The issue is whether the increased rates are just and reasonable. The carriers, the protest shippers and the public generally are alike entitled to just and reasonable freight rates. By this standard alone is the issue to be determined.

"Undoubtedly, the maintenance of good wagon roads throughout the sections of country penetrated by respondent's lines is a matter of material interest to them, and it was stated that their policy has been and is to encourage such enterprises.

"Upon the facts of record we find that the proposed rates named in the suspended tariffs have not been justified."

The county court of Gibson county, Tennessee, last month voted an appropriation of \$10,000 to be used in the construction of two roads across the county—one leading from Humboldt to Kenton and the other from Milan to Eaton. This, it is believed, will prove to be the beginning of a splendid system of highways, of which Gibson county is so much in need.

Bad roads are ear-marks of indolence, carelessness and cussedness.

The Florida State Good Roads Convention

The annual convention of the Florida Good Roads Association was held at Gainesville April 9 and 10. In the opinion of Secretary A. B. Dunning, and others who have been attending the sessions of the annual conventions regularly since the organization of the association, this meeting was the best yet in point of attendance, general interest and enthusiasm, and great good will result from it.

The association convened in the Alachua county courthouse at 10 o'clock, Thursday, April 9, with Dr. J. H. Alderman, president, in the chair and Secretary A. B. Dunning present in his official capacity.

The meeting was opened with a hearty address of welcome from Mayor Chris Matheson, of Gainesville, which was responded to by Mr. L. A. Whitney, of St. Petersburg. The work of registration of delegates began immediately and in less than an hour, 100 duly accredited delegates had been registered.

Secretary Dunning read the minutes of last year's meeting at Eustis, and of the adjourned meeting held in Tallahassee during the session of the legislature. The minutes were adopted as read, and a vote of thanks was tendered to Mr. Dunning for the splendid reports.

The treasurer, J. W. White, of Jacksonville, made his annual report, which showed a cash balance of \$4.19. Mr. White urged each member to be prompt in payment of the annual dues, stating that it was necessary for one gentleman, a citizen of Jacksonville, to contribute \$25 in order to prevent a deficit during the past year as regards printing of stationery, etc. The treasurer was tendered a vote of thanks for his earnestness in the cause of better roads.

Secretary Dunning read a letter from James O. Stevenson of St. Augustine member of the executive committee of the State Chamber of Commerce, stating that the committee would meet in Gainesville during the convention and would be glad to co-operate with the Florida Good Roads Association in every way possible.

The association voted to adopt the Southern Good Roads, published at Lexington, N. C., as the official organ of this body and Henry B. Varner, editor and general manager of the publication, who was present, thanked the association for the action. He offered to devote one or more pages each issue to the roads cause for Florida.

Upon motion of J. W. White, the following resolution was adopted:

"Whereas, the Florida Good Roads Association has been asked to consider and act on the forming of a federation with the National Highway Association. Therefore, be it

"Resolved, By this association in convention assembled, that the question of such federation be left to a committee of three to be appointed by the president with full powers to act and authority to make such changes in the present constitution and by-laws as may be necessary to effect this federation with the National Highways Association."

Those appointed to constitute the committee are Dr. J. H. Alderman, J. W. White and Frank E. Dennis.

The convention closed Friday, April 10, with the election of officers. Capt. W. J. Hillman, Live Oak, was unanimously elected president. J. P. Clarkson of Jacksonville, secretary. J. D. Rooney, of Ocala, treasurer.

It was decided to leave selection of one vice president for each county to the president.

Dr. J. H. Alderman of Gainesville, retiring president, was made chairman of the finance committee.

The board of governors follows: F. O. Miller, W. N. Conoley, Charles A. Clark, Jacksonville; W. M. Curry, of Quincy; C. H. Ward, Miami; G. O. Stevenson, St. Augustine; W. B. Carter, Orange Park; L. A. Whitney, St. Petersburg; J. F. Hardee, J. M. Meffert, Ocala; Joseph Hinley, Live Oak; C. C. Pedrick, Gainesville.

The invitation from Secretary Wimer of the St. Petersburg Board of Trade, was pressed by delegates on the floor and the convention voted unanimously to meet in the Sunshine City in February, 1915. DeLand and St. Augustine were bidders for the next meeting but withdrew in favor of St. Petersburg.

The association adopted resolutions urging better good roads legislation, and also, to secure, if possible, views of candidates for House and Senate upon desired road laws.

Many fine speeches were made but it was the unanimous opinion of the assembled delegates and visitors, that the address of Mr. L. E. Boykin, of the U. S. Office of Public Roads, was the strongest, most logical and common-sense presentment of Florida's needs in the way of road legislation, ever heard in the state. A synopsis of this address has been prepared and will be published in the June issue of Southern Good Roads.

Modern Highway Bristol-Norfolk.

The Bristol-to-Norfolk Highway Association has been formed in Lynchburg, with sixteen counties represented, the object being to work for an east and west cross-state modern highway. The officers are: J. J. Scott, Bedford City, president; W. T. Corwith, Lynchburg, secretary-treasurer; Henry Roberts, Bristol; A. J. Huff, Washington county; John P. Buchanan, Smyth county; E. Lee Trinkle, Wythe county; H. L. Trolinger, Pulaski county; Dr. S. W. Fletcher, Montgomery county; Judge George E. Cassel, Radford; Joseph A. Turner, Roanoke county; J. H. Marsteller, Roanoke county; John T. McKinney, Campbell county; Ernest Williams, Lynchburg; S. L. Ferguson, Appomattox county; J. L. Hart, Prince Edward county; Joseph M. Hurt, Nottoway county; E. S. Hobbs, Dinwiddie county; and C. P. Shaw, Norfolk city, vice presidents.

The plan of the association is for the construction of a modern highway from Bristol to Norfolk, the vice presidents being charged with the duty of promoting and securing the construction of it through their respective counties and cities. They will have authority to appoint executive committeemen for their counties and cities as they may deem proper. That the officers of the association are to have the highway located and surveyed (where not already constructed or located and surveyed) as soon as practicable under the supervision of the State Highway Commissioner of Virginia, and have proper estimates made of the cost of construction through the counties, districts and cities.

The records show that in bond issue campaigns in Texas, more rural votes are cast for bonds than urban. Farmers are voting for themselves, their wives and children when they vote for improved roads.

The tax payer is the man that foots the hills in road building. Let him demand that he gets a dollar's worth for a dollar. This means that the strictest business policy should be applied in road construction.

Charlestown, W. Va., votes on the 18th of this month on a bond issue of \$300,000 for street improvements.

OFFICERS

Wm. F. Cocks, President
Richmond, Va.
C. B. Scott, Jr., V-Pres.
Waynesboro, Va.
F. D. Henley, Secretary
Richmond, Va.
C. S. Mullen, Treasurer
Petersburg, Va.

Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

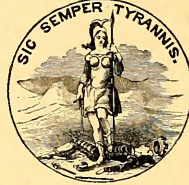
EXECUTIVE COMMITTEE

Hon. G. P. Coleman
Richmond, Va.
Maj. E. H. Gibson
Culpepper, Va.
B. W. Hubbard
Forest Depot, Va.
C. B. Scott
Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary



ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

Bristol-to-Norfolk Highway Association.

Sixteen counties were represented at the formation of the Bristol-to-Norfolk Highway Association which took place at Lynchburg, March 24. The main object of the new association is to work for an east to west modern road crossing the state. It was pointed out that practically the entire route is under contract or contemplated, excepting between Roanoke and Farmville. The officers chosen were:

President Henry Roberts, of Bedford county; secretary-treasurer, T. T. Corwith, Lynchburg; vice-presidents: Washington county, A. J. Huff; Smythe county, John P. Buchanan; Wythe county, E. Lee Trinkle; Pulaski county, H. T. Trollinger; Montgomery, Dr. S. W. Fletcher; Radford, Judge George E. Caswell; Roanoke, J. A. Turner; Roanoke City, J. H. Marsteller; Campbell, John T. McKinney; Lynchburg, Ernest Williams; Appomattox, S. L. Ferguson; Prince Edward, J. L. Hart; Nottoway, Joseph M. Hunt; Dinwiddie, E. S. Hubbs, and Norfolk county, C. P. Shaw.

Other eastern counties will have vice-presidents selected later. The convention by resolution commended the proposed highway and calls upon the press of the state to work for it.

* * *

The Virginia Road Builders' Association—Past and Present.

The Virginia Road Builders' Association is non-partisan and was organized at Richmond, Virginia, November 23, 1911. It was first composed of county officials, contractors and civil engineers engaged in road improvement in the various sections of the state of Virginia. It has had a slow but steady growth and today has a membership including a considerable number of private citizens who are interested in road improvement. The annual dues of the association are \$1, which includes a subscription to Southern Good Roads without extra charge. Its officers serve without compensation and its principal expenses are for stationery, typewriting, printing and postage.

In the past the association has confined its activities largely to the distribution of government bulletins and other information on road improvement, and the discussion of subjects relating to road building and maintenance. It has gradually become apparent to those who have taken the most active interest in the affairs of the association, that it should not confine itself to the discussion of technical subjects, but should also serve as a medium through which the intelligent and progressive people of the state may exert an organized

influence in educating those who are not so well informed in regard to road improvement and in influencing the passage of legislation required for the economical and efficient construction and maintenance of improved roads. It is useless to expect public work to be promptly and economically executed when the laws under which it must be done are so complicated as to be almost inoperative and do not confer the necessary authority on those in charge of the work, or fix definitely their responsibility. The progress of road improvement in Virginia is seriously handicapped for lack of a few laws and amendments to the present laws, to which there are now serious objections. To have the needed laws passed, it will be necessary for those interested in road improvement to take an active interest in these matters and to make their wishes known to their representative in the state legislature. This can best be done through an organization like the Virginia Road Builders' Association, and if the intelligent and thinking people of the state will join this association and co-operate with this end in view, they will be able to yield an influence that will be effective. By joining this association you will also be able to keep abreast of the progress of road building in this and other states, form correct opinions as to what is required, and talk intelligently to others on such matters.

There is no initiation fee required for admission to this association and it is only necessary to make application to the secretary, Mr. F. D. Henley, Box 1056, Richmond, Va., enclosing \$1 annual dues with the application. It is to be hoped that many citizens of the state will become members of our association and thus be in a position to accomplish something tangible in the way of road improvement.

* * *

Highway Meeting at Petersburg.

A meeting in the interest of the Washington-Atlanta highway was held at the Chamber of Commerce, Petersburg, March 18, the purpose of which was to discuss a joint maintenance plan between the American Highway Association, the United States office of public roads and local officials.

It is contemplated that the office of public roads will put three of its engineers on the road continuously and for the county authorities along the line to place the section of road lying within their respective counties under the direction of these government engineers who will direct the expenditure of such funds as are raised locally.

The first step considered was the making of a tour of the roads from Richmond to Atlanta, holding confer-

enees with the county supervisors and leading citizens so as to arrange the necessary plans for putting the maintenance scheme into effect.

Members of the road boards of Diuiddie and Chesterfield counties, Secretary Pennybacker of the American Highway Association, P. St. J. Wilson, assistant director, U. S. office of public roads, and several others interested in the project were present; and after adjournment the tour was commenced.

* * *

The following promotions and appointments have been announced by Honorable G. P. Coleman, State Highway Commissioner:

Mr. S. L. von Gemmingen, resident engineer, Petersburg, Virginia, promoted to assistant engineer, with headquarters at Room 41, Medical Building, Lynchburg, Virginia.

Mr. F. H. Murray, appointed resident engineer, with headquarters at Petersburg, Va., succeeding Mr. S. L. von Gemmingen, promoted.

Mr. A. H. Pettigrew, county engineer, Lebanon, Russell county, Virginia, promoted to assistant engineer, with headquarters at Bristol, Virginia.

Mr. W. F. Anson, resident engineer at Rural Retreat, promoted to county engineer with headquarters at Lebanon, Russell county, Virginia, succeeding Mr. A. H. Pettigrew, promoted.

Mr. W. C. Jones appointed resident engineer, Fairfax county, with headquarters at Alexandria, Virginia.

* * *

Fairfax county bids have been opened at Fairfax courthouse for the construction of thirty miles of improved roads in Mount Vernon District, Fairfax county, which will cost \$116,000. Residents of this district voted recently in favor of a bond issue in the sum of \$90,000. The residue will be appropriated by the state and the United States government.

The United States Senate and Federal Aid.

When the U. S. Senate Committee on post offices and post roads reports on the federal aid good roads measure which found approval in the house of representatives, it is certain to be followed by a quite thorough debate on the most effective plan obtainable, when the subject is approached from a National viewpoint.

Recent replies from U. S. senators to a communication sent to them by George C. Diehl, chairman of the A. A. A. National Good Roads Board, indicate a quite positive interest of the members of the other branch of congress. Considerable opposition has been aroused to the bill passed by the house because of clause 4 embodying the Shackleford roads rental proposition, whereby the federal government would pay the several states a sum per year per mile for so-called use of rural free delivery routes, which would mean a piecemeal and ineffective scattering of federal money in such manner as to practically put a premium upon leaving the dirt roads as they are, except only for such occasional dragging as would qualify them for the \$15 per year per mile. As a matter of fact, in most states it is already required that this class of roads shall be kept in travelable condition. In order to advance a class C dirt road to the class B division of gravel or other similar material, an expenditure of not less than several hundred dollars would be necessary to obtain the increased rental of \$30 per year per mile; while to advance from class B to class A the outlay would be several thousand dollars per mile to secure the \$60 annual payment.

Procedure under clause 3, however, which calls for the expenditure of money on whatever roads are mu-

tually agreed upon by the governor of a state and the secretary of agriculture, seems to meet with quite general approval, though it is not improbable that the appropriation for the first year may be reduced from \$25,000,000 to \$5,000,000. Among those who have not hesitated to express pronounced views on the subject is Senator Lane, of Oregon, who says:

"I would like to see a plan devised by which main highways of the country would be constructed by the government, making use of the army engineers in the construction and have the states, through the use of the prisoners, build feeders to them."

Senator Reed Smoot, of Utah, comes forward with this summation of the subject: "I will frankly state that I am opposed to the so-called Shackleford roads bill, for I believe that it is nothing more nor less than a pork-barrel measure. I am in favor of good roads legislation, but before embarking upon it I believe it is the duty of congress to agree on a comprehensive plan which will not only benefit the states but the nation."

Senator Morris Shepard, of Texas, says: "I am in favor of progressive legislation along this line. I will go thoroughly into the matter at the earliest possible opportunity. The Senate Committee on agriculture, of which I am a member, has reported a good roads bill and it is now on the calendar."

Senator E. Ransdell, of Louisiana: "I assure you that this is a subject which commands my special attention at all times."

Senator John Weeks, of Massachusetts: "Personally I believe that roads should be constructed by local communities, but I am well aware of the fact that we have reached a point where we are almost certain to have national legislation. That being the case my desire is that the money be so appropriated, under a definite plan, that waste may be prevented and the best possible results obtained."

The National Committee on Prison Labor, located at Columbia University, has been conducting an investigation, the findings of which show that the road work performed by the convicts in the different states ranges in value from \$1.50 to \$5.70 per day, with a profit to the state by the use of this labor of from 50c. to \$4.03 per day. In short the contention is well sustained that there is a general and considerable profit at present going to the state by the use of convict labor for road work over the cost by other methods of construction, this saving being quite independent of locality and types of construction, although influenced by the size of the gang used.

At the monthly meeting of the Asheville and Buncombe County Good Roads Association in April, Dr. M. H. Fletcher read a letter from J. C. M. Valentine dealing with the work which is being done on the Asheville-Charlotte highway and furnishing information as to the progress of the work. Good headway is being made on the road, the letter states, Mr. Valentine stating that "we have a beautiful loop up on Middle fork and are now heading for the top of the ridge above Hickory creek. We ought to be at the heavy work just below Oates in about two weeks and hope to move the camp about that time. We have a good location for the camps at 'Craig bridge.'"

Patriotism is accelerated by improved highways and pauperism is encouraged by bad ones.

Six miles of concrete road is to be built under state supervision in Phillips county, Ark., near the town of Helena.

North Carolina Good Roads Association

OFFICERS

H. B. Varner, President
Lexington, N. C.
Joseph Hyde Pratt, Secretary
Chapel Hill, N. C.
Miss H. M. Berry, Asst. Secretary
Chapel Hill, N. C.
Joseph G. Brown, Treasurer
Raleigh, N. C.

VICE-PRESIDENTS

J. L. Patterson, Roanoke Rapids
R. L. May, Trenton
M. C. Winston, Selma
P. H. Hanes, Winston-Salem
P. B. Beard, Salisbury
F. M. Shannhouse, Charlotte
E. C. Chambers, Asheville
A. B. Skelding, Wilmington
H. E. Stacy, Rowland



OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

EXECUTIVE COMMITTEE

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Frank H. Fleece, Thomasville
William Dunn, New Bern
Dr. C. P. Ambler, Asheville
Wade Harris, Charlotte
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J. E. Cameron, Kinston
John C. Drevry, Raleigh
Leonard Tufts, Pinehurst

GOOD ROADS GLEANINGS IN NORTH CAROLINA.

Mount Airy township of Surry county has at last sold the \$80,000 bond issue voted last fall. The township has already completed 16 miles of modern sand-clay roads, and it is estimated that this amount will put all the roads in first-class condition. Work has begun on some of the city streets of Mount Airy. Last fall several blocks of tarry streets were constructed.

* * *

The campaign for a county bond issue is now being carried on in Person county. The vote will be taken on May 12th. Mr. D. Tucker Brown, Organizer and Engineer of the North Carolina Good Roads Association, is assisting in this campaign and several addresses will be made by the state geologist, possibly the governor and other good roads enthusiasts.

* * *

Another good roads campaign is being carried on in Johnston county and this will also be voted on May 12th.

* * *

It is reported that about 12 miles of good sand-clay roads have been built in Wallace road district, Duplin county.

* * *

Lillington township in Harnett county voted a bond issue on April 21st.

* * *

It was stated in the Twin-City Daily Sentinel an election would be held in the near future on the question of issuing bonds for road building.

* * *

Webster township in Jackson county has arranged with the county commissioners to be placed under the same road law as Sylva, Dillsboro and Cullowhee townships, has appointed road trustees and expects to vote on a bond issue.

* * *

The counties of Forsyth, Davie and Fredell are proposing to have an alternate route of the Central Highway pass through their territory, and several meetings have been held in the interest of this highway. The route decided upon by this local committee will begin at the Guilford county line and run thence through Kernersville and Winston-Salem in Forsyth county to the Davie county line on the Yadkin river at a point where the new steel bridge is to be built across the river; running thence by way of Farmington to Mocks-

ville and through Mocksville by way of Calahaln to the Davie and Fredell lines at a point called County Line; thence on to Statesville and through Statesville to the county line at Buffalo Shoals Bridge.

* * *

It is reported that a stock company has been organized to build a toll road in Stokes county from Moore's Springs to Quaker Gap, a distance of 4 miles. This is a part of the road from Rural Hall to Moores Springs.

* * *

CO-OPERATIVE ROAD BUILDING.

The idea of the inhabitants of a neighborhood getting together and building links of roads is becoming more and more prevalent. This idea of co-operation on the part of individuals has been growing for some time; but it was undoubtedly augmented by the good roads days, November, 5 and 6, 1913, proclaimed by Governor Craig.

It is now reported that in No. 8 township, Cleveland county, twenty-five men got together and furnished thirty-six mules, wagons, scrapers, picks and shovels, worked five days, and built three miles of fine graded and surfaced road. A similar effort was made in No. 2 township, Cabarrus county, where a road connecting Kannapolis with the Fredell county line, was opened up and part of the construction paid for by individuals.

Are we to allow the benefits to be derived from these co-operative efforts to remain entirely with the individual? It has been shown in many states that there is a certain amount of co-operation between state and county in connection with road location and construction and between county and township with regard to construction and maintenance, which will give the very best possible results to all of the people throughout the state. No better scheme can probably be worked out than for the state to furnish the engineers, the county finance the proposition for construction, and the township act as a basis for maintenance. With the inauguration of such a system, properly carried out, the economic expenditure of our funds and the utilization of the cheap road materials to be had in many sections of our state, North Carolina would soon eliminate the poor economic conditions attendant upon bad roads.

The Virginia State Highway Commission has contracted for the construction of 32 miles of the Richmond-Washington highway at a cost of about \$100,000. This section of the road is in Fairfax county.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

Under a recent ruling of the state highway commission of Alabama counties that have more than 100 miles of modern highways within their borders, may use state-aid money for the construction of bridges. This ruling, it is claimed, will increase the popularity of the state aid law and induce many counties that have held aloof to use their part of the state funds.

It is noted that in the following counties the state-aid roads are in good condition: Blount, Butler, Colbert, Cullman, Dallas, DeKalb, Elmore, Etowah, Franklin, Hale, Houston, Jackson, Jefferson, Lauderdale, Lawrence, Madison, Marion, Marshall, Morgan, Perry, Shelby, Talladega, Tallapoosa, Walker.

In fair condition—Dale, Geneva, Escambia, Lamar, Marengo, Lee.

In bad condition—Autauga (now being repaired), Coffee, Randolph.

No report has been received as to the condition of state-aid roads in the following counties: Bibb, Bullock, Chambers, Chilton, Clay, Limestone, Lowndes, Mobile, Pickens, St. Clair.

Applications have been received for 1914 aid from thirty-three counties, as follows: Macon, Fayette, Jefferson, Pike, Hale, Montgomery, Dallas, Calhoun, Houston, Butler, Morgan, Marion, Lowndes, Chilton, Coosa, Perry, Escambia, Lamar, Blount, Etowah, Colbert, Bibb, Franklin, Dale, Lawrence, Geneva, Elmore, Mobile, Sumter, Cullman, Jackson, Walker and Russell.

The following counties have never taken state-aid and by their failure to do so are losing \$2,000 annually: Baldwin, Choctaw, Cherokee, Clarke, Conecuh, Monroe, Wilcox.

During the last quarter work has been finished in the following counties: Calhoun, Butler, Dallas.

Work begun in the following counties; Henry, DeKalb, Crenshaw.

Contracts awarded during the quarter are as follows: Calhoun county, amount \$6,542.28; Crenshaw county, amount \$10,542.26.

* * *

Indiana.

Officials of the Indiana Good Roads Association have received encouraging reports recently concerning the campaign of organization started recently. G. E. Minor, the state organizer for the association, sent out circulars concerning road conditions in Indiana.

Statistics on expenditures which Mr. Minor has sent out, show that in 1913 the total expenditures for road improvement in Indiana amounted to \$13,707,310.06 and, out of that amount of money, gravel roads were the best highways constructed. Gravel roads are not considered permanent highways, and Mr. Minor and other officials of the association, believe that for the same amount of money, the state should receive greater returns. Other statistics show that there are 4,700 unskilled workmen employed to look after road construction.

The association is supporting the state highway commission system of road development and improvement, and it will endeavor to have a law passed creating such a commission.

Illinois.

Warden Allen and the prison commissioners of the Joliet penitentiary are about to open an honor camp at Deer Park Glen near Ottawa on May 1. It is intended during the summer to send fourteen more camps to various counties throughout the state. It is expected that over 500 convicts will be sent from the prison to start road work throughout the state during the month of May. The success of the first road camp near Dixon last year demonstrated the fact that prison labor can be used with advantage and it is hoped that thus the good roads problem will be solved.

* * *

Missouri.

Efforts to unite all good roads associations of Missouri into a central body were started in Kansas City last month when representatives of seven good road organizations of the state met in the Midland building and united in a resolution calling for a good roads mass meeting at Jefferson City, May 14. It is the intention of organizing a state better roads federation at that time.

Aside from setting a date for the mass meeting, no action was taken, it being the purpose of those attending to invite all organizations to join in any action deemed advantageous. In calling a mass meeting they believe that members of all road organizations, as well as commercial clubs, motor car associations, county courts, agricultural associations, labor organizations, real estate bodies and other organizations that consider civic matters will be interested enough to send delegates, and action then will be representative of all bodies anxious to obtain better roads in the state.

Those who attended the meeting believe that a combined effort will be of more influence and result in real activities, and that all of Missouri ought to centralize on certain plans and, working out from the central body, individual organizations will be able to accomplish more good. Again, they believe, that a state conference will outline action to the good of every community and to a general good of the state as a whole.

The conference resulted from correspondence sent out by J. M. Lowe, president of the National Old Trails Association. It was attended by Frank A. Davis, secretary of the Old Trails Association; C. F. Adams, Chillicothe, president of the Pikes Peak Ocean-to-Ocean Highway Association; Frank W. Buffum, Louisiana, state highway commissioner; Jewell Mayes, secretary of the state board of agriculture; Roy F. Britton, St. Louis, president of the Missouri State Highway Association; W. A. Alsdorf, representing the National Highways' Association; Charles W. Fear, Joplin, secretary of the Ozark Trail Association and G. J. Hinshaw and E. W. Shannon of Kansas City.

* * *

New York.

No more significant good roads message ever has been delivered by a state executive than that by Governor Glynn at Albany last month.

He said that New York must either change its road policy or prepare to levy a perpetual yearly road tax of \$2 on every man, woman and child in the state. In-

stead of roads that wear out in ten years and cost \$1000 a year per mile to maintain, roads must be built that will last from twenty to thirty years, and cost only \$10 to \$50 a mile for repairs. Even if New York were compelled to pay \$25,000 a mile for brick roads, he said it would be economy to build such roads instead of macadam roads in all places where the state highways are subjected to heavy automobile traffic.

Under the fifty-year bond issues the 12,000 mile state road system will wear out forty years before it is paid for unless durable construction is adopted. Although the first cost of concrete roads is from \$2000 to \$3000 more per mile than the best macadam, and brick roads cost from \$10,000 to \$12,000 more, the saving in yearly maintenance of the brick road would amount to \$10,000 a mile.

* * *
Ohio.

A total of \$3,314,404.50 has been derived by the state from the recent semi-annual settlement with it by counties. Most of this money goes into the good roads fund, the amount for this purpose being \$1,681,560.85.

Of the amount given for the road fund, Cuyahoga county contributed \$245,033.05, Hamilton \$160,325.30, Franklin \$79,106.50, Lucas \$69,362.06. Vinton county, with \$2589.68, was the smallest contributor.

* * *
Tennessee.

The county court of Sullivan county, Tennessee, on April 6th, authorized an additional road bond issue of \$100,000 to complete the system of roads under construction and to construct additional roads.

The court also let the contract for a new steel bridge, to cost \$9,200 across the South Fork of Holston River, on the road from Bristol to Mountain City, being a part of the Crest of the Blue Ridge Highway and the Bristol to Charlotte Highway. An appropriation of \$5,500 from the bond issue authorized was made for this road also. Sullivan county has constructed the 12 miles of this road from Bristol to the river, and the additional appropriation will be used in grading from the bridge toward the Johnson county line, 8 miles.

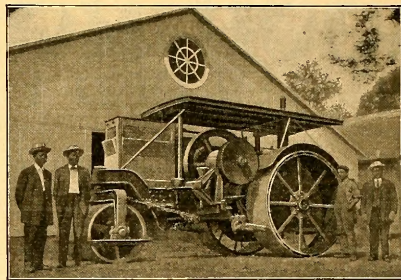
Renewed efforts will now be made to get the county court of Johnson county to allow the citizens of that county to vote on a bond issue to build the 28 miles of this highway across that county to the Watauga county line, and Watauga county, N. C., is expected to construct the 18 miles to Boone, from which point there is a good road via Blowing Rock, and Lenoir to Hickory, where connection is made with the Central Highway of North Carolina.

Sullivan county is building a magnificent system of macadam roads. The county first issued \$100,000 bond bonds, then \$200,000 additional, and later \$200,000 more, and this last \$100,000 makes a total of \$600,000, in addition to which the county is expending about \$33,000 by direct levy for certain bridges.

* * *
Texas.

The following good roads notes are gleaned from the bulletins sent out by the Texas Commercial Secretaries' Association, of Fort Worth:

Fifty paroled convicts in a special coach, in charge of R. G. Christian, superintendent of good roads construction, arrived in Lindale recently. The convicts were put to work on the roads leading out of Lindale and are working on "their honor" without guards. The prisoners are so delighted with the change in their condition that they have organized among themselves and



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intend to inflict punishment upon any convict who violates his parole or who doesn't comply strictly with rules and regulations. The convicts believe that by making good on this experiment will lead to their being pardoned sooner or later and that it will be the means of allowing others to be benefitted by being permitted to labor "on their honor." The men are dressed in khaki suits and leggings and have very much the appearance of soldiers.

Mineral Wells.—With a majority of 4 to 1 the taxpayers in precinct No. 1 voted the issuance of good roads bonds last month, in the sum of one hundred thousand dollars. A two hundred thousand dollar issue for the entire county was defeated in November.

Waco.—Good roads advocates in Waco precinct won a decided victory when they voted the issuance of highway bonds in the sum of \$1,075,00. The project carried by 188 votes in excess of the two-thirds majority, and the victory was attributed largely to the unwavering support of the local commercial organization. Credit is also due the pastors of Waco, who heralded the need of more and better roads from their pulpits. The rural vote was practically solid for the bonds.

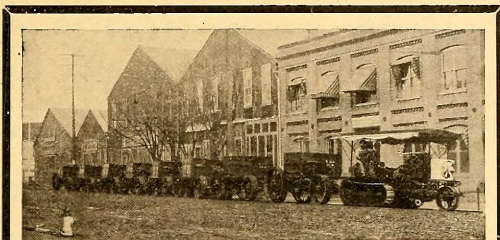
Houston.—The county commissioners at a recent meeting ordered the improvement of eight important Harris county roads and the erection of two modern bridges. Work will commence at an early date. The money for these improvements will come from the \$1,000,000 road and bridge bond issue voted in this county some time ago.

Marshall.—Harrison county got into the good roads column last month when its citizens voted, by a big majority, for the issue of \$300,000 bonds.

Good roads advocates of Brooks, one of the youngest counties, March 14, carried a \$34,000 issue by an overwhelming majority. The bonds will be placed on the market within a few weeks preparatory to the beginning of highway building in that county.

Forney.—At a special road bond election the good roads advocates of this place won a conspicuous victory when they voted the issuance of highway bonds in the sum of \$25,000. The issue carried by about a 3 to 1 majority.

At Fairmont, W. Va., last month the county court awarded contracts for road paving in Mannington district, the aggregate contract price of which was \$332,686.82; this does not include several bridges which must be constructed. The contracts were let in seven separate parcels and were awarded to three different firms. There were twelve firms bidding and they each gave bids on six different kinds of roads for each parcel.



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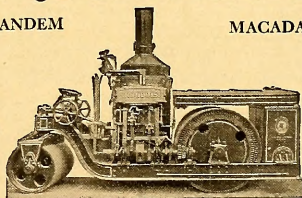
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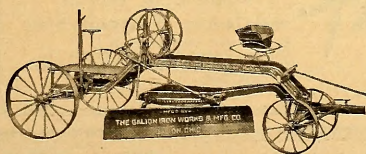
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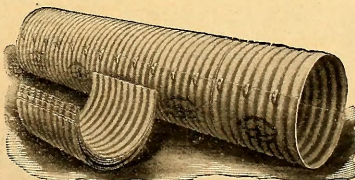
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How Good Roads Affect Rural Women

By MRS. MARCH CULMORE

An Address Delivered Before the Texas Good Roads Association at the Fort Worth Convention

WHEN Mrs. Henry B. Fall, president of the State Federation of Women's Clubs asked me to come here today, and as her representative speak before this Good Roads Convention, as to what good roads would mean to the women of Texas, especially the rural women, I confess I hesitated to accept the honor thus conferred. It seemed a mighty big thing. My first thought was, could I do the subject justice? Was I equal to the task? After considering the question, however, I consented, for I saw a splendid opportunity to at least add my enthusiasm to that already engendered by the movement, and perhaps be the means of awakening others to see the great need of more and better roads throughout the country.

So I bring you greetings this morning from twelve thousand active, earnest, serious-minded club women, representing all the phases of club activity, striving for the betterment of the individual, and humanity as a whole. They come from every village, town, city and county in the state, standing ready and willing to co-operate with you in this great movement, one that has taken hold of the minds and interest of the entire country.

The club women realize that this work of building good roads is directly connected with their own, especially in the civic work, and in the betterment of conditions and the environment of the country women. They know before anything of a lasting nature may be done and be in line of work they have undertaken for the coming year, they must have good roads and good streets and they are only too willing to put forth every effort to accomplish this, and help lift the country out of the mud.

I had the good fortune to attend the state federation meeting of women's clubs held in Corpus Christi last November, and running through the entire session were general discussions. "How to help the Rural Women," "How to make her life broader, richer, better; How to get in closer touch with her." That is to be the real work of club women this year.

There was a little woman at the convention from away up in the Panhandle—Claude, Texas. We called her the "Little Brown Wren." Why she fairly electrified the women by telling of some of the things that had been done in her part of the country. It was marvelous the difficulties that had been overcome. They have a county federation of women's clubs that is also a social center, all of the school teachers being active members of the club. They have a number of good schools, and several churches. And the settlements in the rural communities are very far apart. All of these improvements have been brought about in the last few years; a comparatively short time, by a few earnest women working together for a common purpose—but

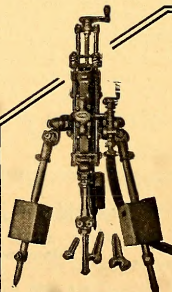
in that part of Texas they have very little mud. Their roads are naturally good and I know that the same amount of work could not have been accomplished in the same length of time in any part of the state having bottomless roads sometimes for five months in the year.

Good roads mean the same thing, perhaps more to the country woman, than good streets mean to the women living in the city. They mean first of all that her child may go to school with regularity, keeping their feet dry. Dry feet, with warm clothing and fresh air mean healthy children.

It has been said the "Good roads and the school master are the two most important agents in advancing civilization." And it's true. The education of the child is dear to all of us, but it is the dearest and most important thing in life, aside from health—to the mother. With good roads the child living in the country may have the proper education, for then the schools may be centralized, and with roads in proper condition a child may easily travel a number of miles. The wonder is how they attend school at all in some districts under existing conditions.

Down in Harris county where we have such splendid rural schools, we also have some mighty good shell roads. So a means toward assisting in education is one of the many benefits to be derived from good roads—that alone is a very apparent and sufficient reason for their construction.

Do you know that it is a deplorable truth—in spite of the clearness of vision generally found in the woman from the country who attend federation meetings, that half of the women inmates of the insane asylums are country women—that most of the girls in reform or training schools came from the country. The awful monotony of their lives have driven the older women



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crazy, and the young girls to the cities to fall into temptation. Think of the days and weeks that the roads are impassable when the women must remain within their four walls, isolated from the world. Is it any wonder that some lose their minds? Is it any wonder that the young woman becomes desperate and goes to the already overly crowded city to seek both pleasure and employment, only in her ignorance to find pitfalls in her pathway. Isn't it about time that something were done to remedy these conditions?

The greatest draw-back to the rural life to-day are bad roads—and the farmer's wife and daughter suffer most. Isn't it about time to remedy these conditions? Isn't it?

We need the country woman just as much as she needs us. She knows many things that we do not. She knows the value of the conservation movement. She knows the results of the proper use of fresh air—and no one knows better than she what good roads would mean to our country—for then the way would be opened to her for the fulfillment of her most cherished desire; then too, we would be brought into closer relationship, each helping the other, we to bring sweetness and sunshine into her monotonous life, and she giving us of her practical knowledge.

This good roads movement has already had a wonderful moral effect on the country at large. It has aroused the people. It has made them think, to realize that their own interest and that of the state is at stake. Of course as a result of this keen interest manifested, the necessary fund will be forthcoming with which to begin the actual work, and the very enthusiasm created will carry it through.

We have all dreamed of a "State Useful, a State Beautiful." We have pictured in our mind's eye this great, big, wonderfully resourceful state of ours—peopled, dotted with farmers, mills, factories. Factories and mills in which every article of household use and wearing apparel has been made. In the midst of these farms, factories and mills, are settlements, rural communities, in which are schools and churches—centralized. And leading to them are broad highways, beautifully kept, over which these captains of industry may get their goods to market, and perhaps attend a club meeting in town occasionally—when some noted speaker like W. J. Bryan, or President Wilson is the attraction.

When the housewife may do her shopping, have her purchases delivered quickly—when she may have the diversion of attending a mothers' club, or social meeting. When her child may attend school every day, and Sunday school every week. When father, mother and children may go to church regularly. Yes, this has been the dream of every right thinking, public spirited man and woman. All things are dreams before they are realities, but the time is not coming; it is here, for this vision to become an accomplished fact, and it is the duty, nay—the privilege of every one of us to help in the undertaking. Good roads first, and the rest will follow.

Now we women are perfectly willing to let the men don the overalls, and with pick and shovel work the roads, but we'll be glad to fix your lunch and go along with you to show you where the deepest holes are to be found. We also leave it to the good men of the state, as to how the work is to be done, but I would suggest that we put these twelve thousand soldiers in Texas City that are so dissatisfied with their present environments to work; it would be good exercise for them, and they would see some of the really beautiful country in Texas. They are so tired of the sand, and of looking at Galveston Bay. So as long as we aren't going to

have any war with Mexico, they had better be doing something to earn their board and keep. We might suggest to even urge Uncle Sam to raise their salary, should they go to work.

Now I going to let some gentlemen from Harris county tell of the work being done there, and about what we intend to do with the road passing the Rice Institute.

In closing I wish to say that I consider it a great honor and privilege to have addressed this convention today, and I hope the good roads work will continue until the mud holes in every road in Texas are transformed into thorough-fares of durability and beauty over which it would be a perfect joy and delight to travel.

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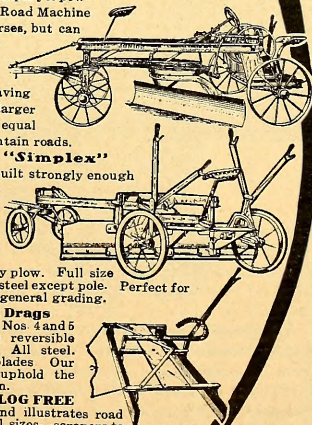
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Dallas County Road System and North Texas Road Materials

By J. F. WITT

Highway Engineer, Dallas County, Texas

DALLAS county is thirty miles square. The city of Dallas, with a population of 125,000, is located in the center of the county. There are 1300 miles of public roads in the county, 500 miles of which have a metalled surface. These 500 miles include 12 main roads radiating from the city of Dallas to the county line; one belt line road 'round the county, at an average distance from the city of approximately 10 miles, and a series of cross-roads that connect the main roads with out-lying towns and thickly populated communities. This system is so laid out that the 500 miles (or 38 per

cropping out at Mineral Wells, in Palo Pinto county, and again near Ranger in Eastland county.

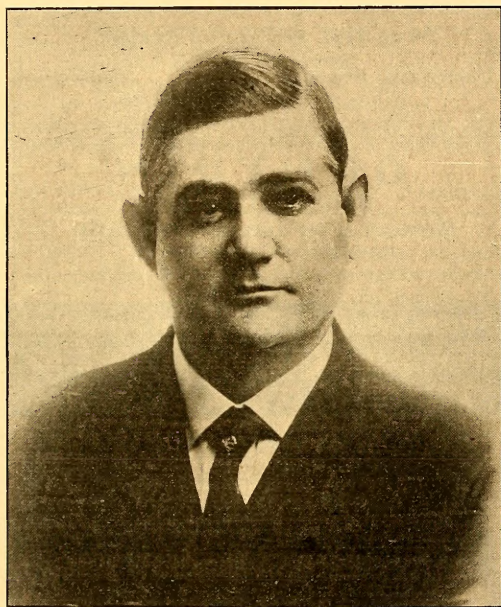
There are crushing plants at Jacksboro, Mineral Wells and Tiffin (near Ranger,) all of which are using this rock. We have used rock on the Dallas county roads from each of these quarries. There seems to be very little, if any, difference in the quality of stone from either of them.

In the selection of material for the best gravel roads, we have endeavored to get the following as an ideal road gravel: 65 per cent of hard, tough pebbles, in size from $\frac{1}{4}$ inch up to $2\frac{1}{4}$ inches; 20% of coarse, clean, sand, and 15 % of plastic clay-preferably, the light yellow or purer clays. Of course, it is a hard matter to get this kind of material, but for our best grade of gravel roads we have used this ideal as a basis to work from—in some cases remixing the constituent parts to get the desired result; but the cost of remixing is usually prohibitive.

For a large part of our gravel roads, we have used what is locally known as "white rock gravel," a soft gravel that runs high in free lime and silicious clay, being an admixture of calcareous and argillaceous materials. The above is not a first class road gravel, but local conditions have caused this county to use a lot of it, where the haul is short, etc. We have often placed this material on a road at an expense of not more than fifty cents per cubic yard.

In the eastern part of this county there is a gravel deposit that is especially good for road surfacing. Pebbles of good size, proportion and quality, good sand and clay splendidly distributed. Looking at the face of a ten foot bank in the pit, the material has the appearance of a good, clean gravel, suitable for concrete, but on closer inspection, each pebble is found to have a thin film of clay as a covering. This material is easy to handle; sets up readily after being placed on the road, and has "body" sufficient to stand up under reasonably heavy traffic.

As before stated, Dallas county gets all its gravel from within the county, though there are parts of the county where there is no gravel, or any other kind of road surfacing material. As a whole, we are bountifully supplied, the different privately-owned beds fur-



MR. J. F. WITT

County Engineer, Dallas County, Texas

cent. of the total mileage) controls and carries 85 per cent. of the county's traffic; 420 miles are gravel roads; 60 miles gravel surfacing, over a soft limestone base, 15 miles of water-bound, crushed, hard limestone macadam, and 5 miles of asphalt macadam.

All gravel and soft limestone was procured in this county, while the crushed, hard limestone was shipped from the limestone quarries at Jacksboro, 100 miles northwest of Dallas, and from Tiffin, 123 miles west of Dallas. This limestone has a crushing strength of approximately 10,000 pounds per square inch; is tough, and of a fibrous nature, and is probably the best material in Texas for road surfaces, excepting the Uvalde rock asphalt of southwest Texas. The ledge from which this rock is taken, begins in or near Jacksboro, in Jack county, extends in a southwesterly course,

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nishing gravel to a number of the surrounding counties, for all kinds of public works.

In the laying out and construction of a good road system, it was necessary to construct several important bridges, among the number, being the Dallas-Oak Cliff viaduct, across the Trinity River valley, (this bridge being within the city limits, but constructed and owned by the county) at a cost of \$680,000. The Miller's Ferry bridge across the Trinity, four miles below Dallas, at a cost of \$102,000; the Hutchins, Wilmer and Molloy swing bridges across the Trinity, 14, 18 and 22 miles below Dallas, at a total cost for the three, of \$75,000.

In addition to the different materials heretofore mentioned as being used by Dallas county for road surfacing, there is a good quality of limestone at Alvord, in Wise county; at Mexia and Groesbeck, in Limestone county, and near Terrell in Kaufman county, and a few other scattering places in North Texas.

While nearly every county in this section has stone of more or less value for base courses in macadam, the best of this kind of stone being a conglomerate sand and limestone, the percentage of sand usually runs too high to permit of its use for top courses, or where subject to abrasion.

There are gravel deposits in Ellis, Tarrant, Kaufman, Johnson, and other counties of North Texas that have different values as road material. Some should be used only as a last alternative to get out of the mud, with others of different grades up to the ideal mixture before mentioned. There are a few deposits of ferruginous gravel in this section of the state, especially in Tarrant county, that makes good roads.

Speaking generally, North Texas has plenty of good road surfacing material, but it is unevenly distributed; some counties have very little, and others an abundance. This uneven distribution runs the cost of road construction up so high in some counties as to be almost prohibitive; thus retarding in a way any trans-state roads. This condition is, however, being overcome by the admirable pluck of the people of these less fortunate counties in the voting of good roads bonds in sufficient amount to ship material in for their work.

Good Roads Notes in Brief.

Raleigh county, W. Va., votes June 9 on a bond issue of \$180,000 for road building.

St. Tammany Parish, Louisiana, votes June 3 on a bond issue of \$180,000 to build 200 miles of roads.

On May 20 Teague road district of Freestone county, Texas, will vote on a bond issue of \$150,000 for roads.

The State Roads Commission of Maryland has recently let the contracts for road construction amounting to \$188,000.

The city of Birmingham, Alabama, will spend about \$30,000 in street improvement.

Bexar county, Texas, is asking for bids on 78 miles of gravel road.

The city of Raleigh, N. C., has contracted for 120,000 square yards of asphalt paving.

Middlesboro, Ky., will spend \$100,000 in paving streets.

Lexington, Ky., will pave six blocks with asphalt.

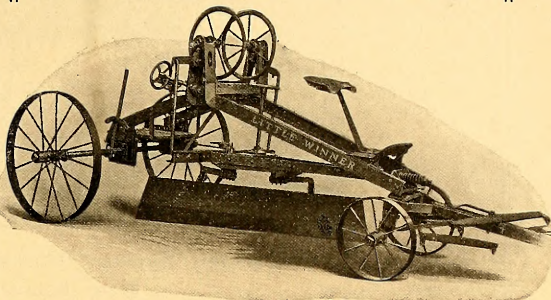
Harnett county, N. C., will construct 15 miles of gravel and sand clay road.

Hopkins county, Ky., is in the midst of a campaign for a \$250,000 bond issue for roads.

Orlando, Fla., will construct 138,000 square yards of vitrified brick paving.

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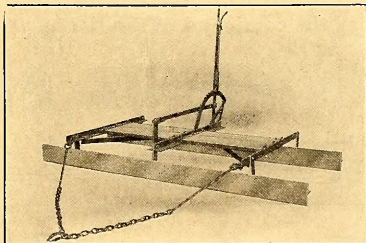
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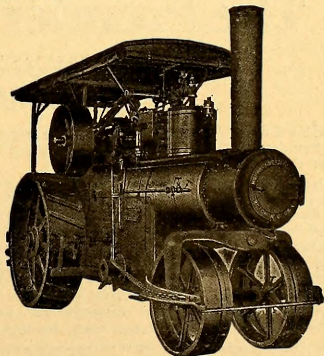
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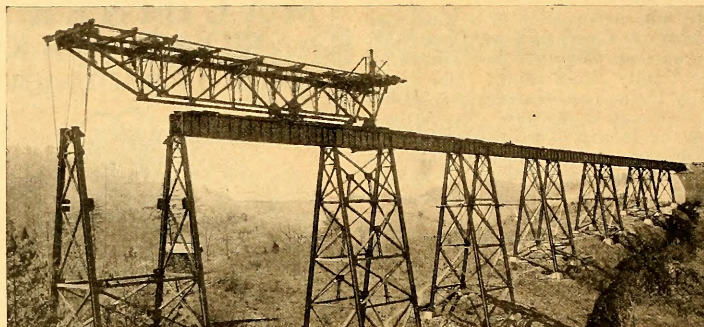
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Sand Clay and Top Soils Roads For N. C.

By JOSEPH HYDE PRATT

State Geologist

IN MANY sections of North Carolina the communities have not sufficient funds for road purposes to enable them to construct the more expensive roads; such as, bituminous macadam, bitulithic, vitrified, brick, concrete, or even water-bound macadam. There are roads, however, that come within the means of all communities, and these are the sand-clay and topsoil. Unless traffic is very severe these roads will give satisfactory road conditions, and whenever the traffic becomes so heavy that a harder surface is necessary there will be a splendid foundation upon which to build the

a special surfaced road, just as distinct a road as the macadam, cement or vitrified brick. The same care and preparations should be employed in grading and preparing the roadbed for these surfacing materials as when the other, harder materials are to be used. The present paper deals with the surfacing of the road after the grade has been completed. The portion of the road that is to be surfaced with sand-clay topsoil or gravel should be left nearly flat and sufficiently low so that when the surfacing is completed, the road will have the right slope from the center to the ditches.

There is a tendency in grading the roadbed to leave that portion which is to be surfaced too high, with the result that either the finished road has altogether too steep a crown or the surfacing material is not thick enough. The thickness required will depend upon the character of the subsoil.

In certain localities where there are both clay and sand soils, the ordinary country road is found to contain sections that are composed principally of clay, others of sand, and occasionally a section is observed that is hard all the time. This upon investigation will be found to be composed not of clay or sand but a mixture of these two. In such regions it is not uncommon to find soils that are a mixture of sand and clay and in such proportions that when used for surfacing a road they make a hard surface like the natural surface just referred to. Such material is known as topsoil, and the road as a "topsoil road." When, however, it is necessary to mix the two artificially it is called a sand-clay road.

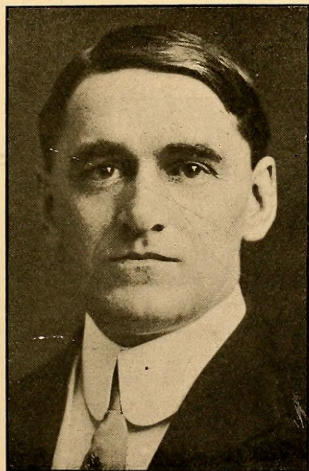
I first want to take up the sand-clay roads: A recent article in the Greensboro Daily News gives the following:

"Of the various stretches of sand-clay about Greensboro, some are now in good condition, some are very bad and some are neither the one nor the other. All have gone through the same weather, and the differing conditions are in evidence on stretches of road that have apparently had about the same amount and kind of traffic. Why is it that some parts are still good and others are horrid? Answer that, and you have found all the essential secrets of substantial road building and maintenance in this part of Guilford county."

This is undoubtedly true and it will be found that one section of the road was constructed in the right way and with the right kind of materials.

Construction of the Sand-Clay Road—Quality of the Sand and the Clay.

Before beginning the construction of a sand-clay road, the sand and clay in the vicinity of the road



DR. JOSEPH HYDE PRATT
State Geologist, North Carolina Geological and Economic Survey

new surface road. It will also mean that the community has acquired sufficient wealth to enable it to build the harder surfaced roads. Where counties have sufficient funds to enable them to build macadam roads the North Carolina Geological and Economic Survey advises that such counties build the bituminous macadam roads, in the environment of the cities, where the traffic is heavy, and supplement this road with the sand-clay or topsoil road leading to the boundaries of the county.

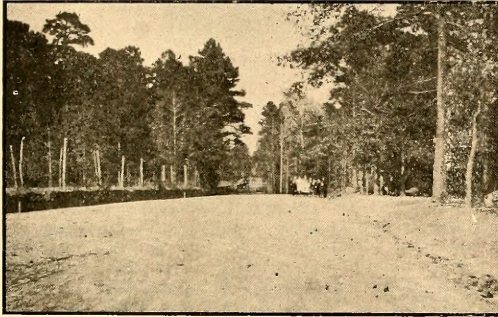
In discussing a sand-clay, topsoil or gravel road we must bear in mind that we have under consideration

should be examined to ascertain whether they have the right properties necessary to build a first-class sand-clay road. The best sand or gravel to use is that which has a sharp cutting edge and it should not be in too fine grains. A clean, sharp grit, such as is desired in making mortar is the quality of sand that is wanted. The best results are obtained, however, when the grains of sand are coarser than those used in making mortar. While any clean sand will make a sand-clay road, the sharper the grit the better the resulting road. The characteristics which are most desirable in the clay are plasticity and the ability to slake well when it first becomes wet. A clay is called plastic when it becomes sticky or dough-like when mixed with

amount of clay, and no more, to fill the voids between the grains of sand when these grains are touching each other. The clay is the binder that is to hold the grains of sand in place and there should not be any more than is sufficient for this purpose. If to large a proportion of clay is used, the grains of sand are prevented from touching each other and are able to move about each other in the mass of clay so that the resistance of the mass to the wearing effect of traffic is practically no more than if the road was composed simply of clay. Water is also able to act upon the mass of clay and the road becomes sticky and muddy. If there is too small a proportion of clay used, the grains of sand are not cemented tightly together and the road disintegrates very quickly under traffic and rain.

The exact proportions of sand and clay for making the best sand-clay road can not be stated, as the proportions vary with the character of the sand, according to its sharpness, percentage of foreign material and size of grains. Approximately there is in a sand-clay road about eighty per cent sand and twenty per cent clay. One simple means of determining the theoretical amount of pure clay that should be added to any sand that is to be used in the construction of a sand-clay road is to fill a glass tumbler brimfull with the sand that is to be used and then fill a similar tumbler with water; pour the water carefully onto the sand until the water comes flush with the surface, which will mean that all the voids between the grains of sand are now filled with water. The amount of water that has been poured into the tumbler containing the sand will represent the proportion by volume of clay that it is necessary to add to that particular sand to fill all the voids with clay.

A suitable clay may be found in the subsoil of the road, to which sand must be added; or the sand re-

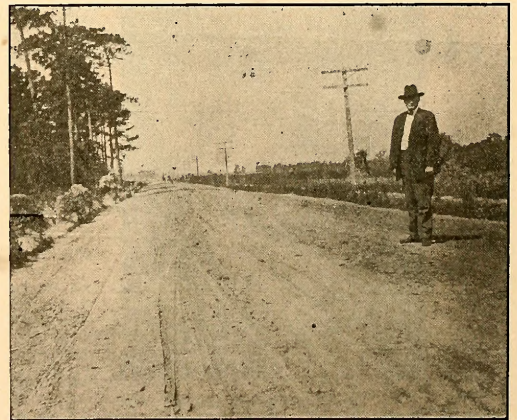


A well crowned dirt road in New Hanover county, North Carolina. A school house at the right and a crowd of school children in the road.

a certain amount of water, so that it can be molded or pressed into various shapes which it will retain even after it has been dried. If a lump of such clay is put in water, it will usually retain its form for a long time. These are other clays, however, which will immediately fall to pieces when placed in water as a lump of quick-lime will do under similar conditions. This is due to the very rapid absorption of water into the porous construction of the clay. It can readily be seen that this characteristic is an important one when considering the material to be used in a sand-clay road, and if possible such clays should be avoided. There is still another physical characteristic of clay which is to be considered from the standpoint of the road builder. Some clays shrink when dried, which is shown by the cracking and breaking out of their surfaces. This shrinkage is the measure of their expansion and expansion makes a sand-clay composition unstable. Shrinkage would do no harm if the clay would stay in this condition, but it does not. When water, removed by evaporation, is restored to the sand-clay mixture, its entrance is accompanied by a simultaneous expansion which causes the grains of sand to become separated. This property can not be overcome for it is inherent in the clay, but we can in some measure modify this fact by using less clay in the composition. This, however, will weaken the road and cause it to break up in dry weather. Avoid such clays if possible.

One good test for a clay is to wet the thumb and place it against the clay, and if it sticks to the thumb it is of the right quality for making a sand-clay road. If, on the other hand, it does not stick to the thumb, we are safe in assuming that this particular clay will not make a good binder. In general, select the stickiest clay and the sharpest sand available.

The proportion of sand and clay in the best sand-clay road should be such that there is just a sufficient



Sand Clay Road in Edgecombe County, North Carolina, Built Under the Supervision of Mr. J. W. Martin, County Superintendent of Roads Who Appears in the Picture

quired may be the subsoil to which clay must be added; or it may be necessary to obtain away from the road both constituents for the sand-clay surfacing.

Method of Mixing Sand and Clay.

Having determined the source of supply of the best materials for making a sand-clay road, the next question is the mixing of the materials, and this varies with the character of the subsoil, whether this is a sand upon which clay is to be added or clay upon which sand

is to be added, or whether both sand and clay have to be hauled onto the road. It will be found that it is much easier to make a sand-clay road where the subsoil is a clay.

Clay Subsoil.

The road should be properly located and graded. There are two ways of preparing the surface of the road before the surfacing material is added. One which has been found very satisfactory is shaping road from the ditches to within $1\frac{1}{2}$ to 2 feet of that portion of the road that is to be sand-clayed with the right slope that is desired for the finished road, and then shaping the road from that point to the center with a very slight grade, so that when the surfacing material is added and set it will give the right slope from the center to the ditches. The sand-clay mixture will feather-edge to that portion of the road that is already been given the right slope. Another method is to leave that portion of the road that is to be surfaced about two to three inches lower than what is desired when the road is completed. This will give a shoulder on each side. When this is finished the portion of the road that is to be sand-clayed either nine to sixteen feet in the center, should when perfectly dry be plowed to a depth of three inches and thoroughly harrowed with a cut-away (disc) harrow. The sand should then be spread over the surface to a depth of four inches and thoroughly harrowed in, and then four more inches of sand spread over the surface, and again thoroughly harrowed. After this mixing of the sand and clay is completed the road should be dragged. A

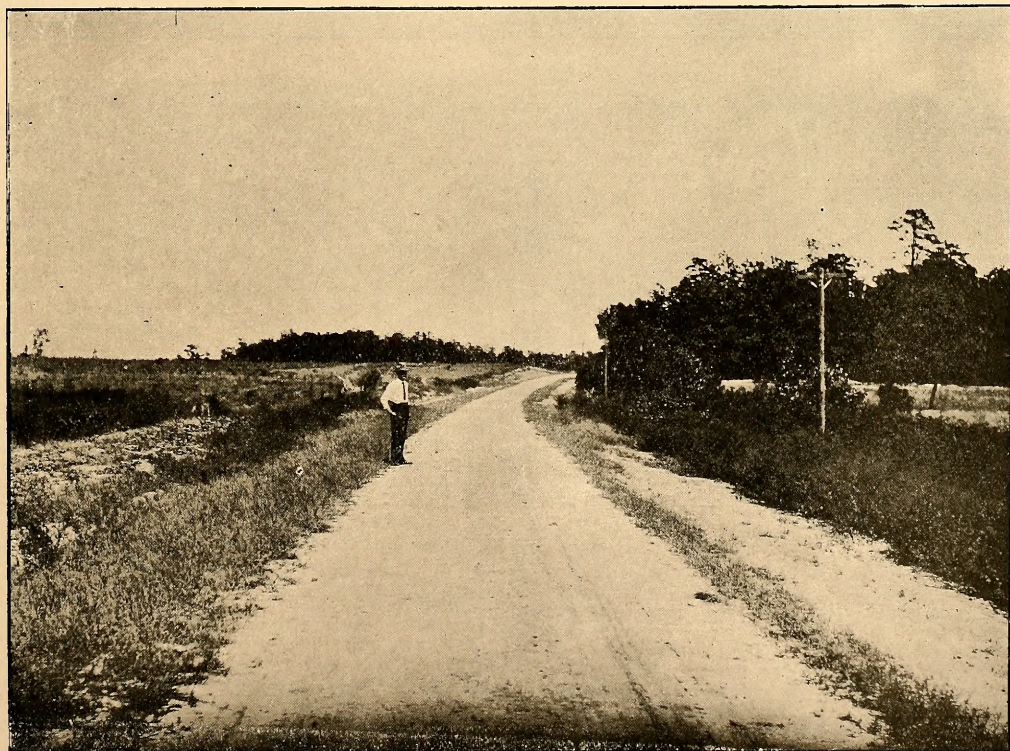
slight crust will form but with the first rain this will break through for the mixed sand and clay underneath have not cemented but are loose particles. After the first heavy rain the road should again be harrowed and then dragged into shape so as to give it the proper crown, and it will then become a firm, hard-surfaced road. If a roller is convenient this may be used to some advantage, but a roller is of but little advantage.

Very often this second mixing is left entirely to teams. In the end a satisfactory road is obtained, but it takes a much longer time.

If the sand-clay road is constructed as outlined above and good clean sharp sand is used on a plastic clay, a first-class sand-clay road will be the result.

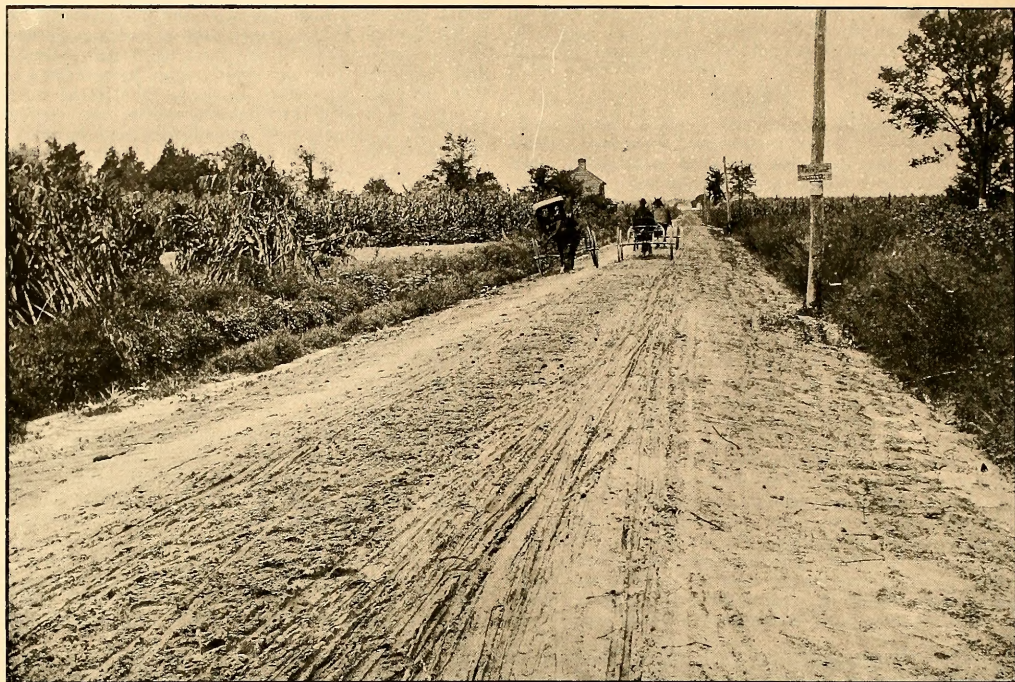
In too many instances in constructing a sand-clay road the sand has simply been spread over the clay and it has been left for teams to mix it in with the clay. This takes a long time and very often there is not a thorough mixing of the two materials, so that the resultant road is not always uniform in its construction and does not give as good satisfaction as when constructed by the method described above.

If the sand is added to the clay road when it is wet the harrowing can all be done at one time, and, when shaped up and dried out, it becomes a hard-surfaced road. The main objections to making the sand-clay road in this way are that unless the clay road is extremely muddy and wet the harrowing of the sand into the clay causes considerable of the clay to get into round balls, which are not broken up by the harrowing; and that is not as even a mixing of the sand and



Fine Top Soil Section of the Central Highway near Statesville, N. C.

NORTH CAROLINA
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Sand clay road near New Berne, N. C.

the clay as when they are thoroughly mixed dry and then harrowed later when they are wet.

Sand Subsoil.

If in making the sand-clay road we start with a sand subsoil and have to add clay to this, the method of procedure is somewhat different from the case outlined above. The sandy roadbed should be left flat and then a layer of clay spread over it to a thickness of 3 to 7 inches, according to the quality of the clay and the amount of sand which it contains. If it is a very pure plastic clay it will take a much smaller amount than if it is a very lean or sandy clay. There should then be spread over the clay a layer of clean sand and the road thoroughly harrowed. After this has been accomplished, the road should be brought back into shape and then after a heavy rain again harrowed and shaped up. There is usually a tendency to get too much clay in making a sand-clay road when the sand is the subsoil. If the clay that has been used is a very plastic clay, there is going to be considerable tendency for it to ball and cake so that a plow can very often be used to advantage in breaking up the lumps. If, however, the mixing is made when everything is perfectly dry, a pretty complete mixture can be obtained by harrowing unless the clay has been dug when it was wet.

One noticeable difference in making a sand-clay road with a sand subsoil instead of a clay subsoil is that the number of loads of clay that it is necessary to haul is much less than the number of loads of sand.

The cost, however, of obtaining a thorough mixture of clay on sand is much greater than with sand on clay.

As stated above, it is impossible to determine exactly the proportions of sand and clay to use either in making the sand-clay road on a clay subsoil or on a

sand subsoil; and, therefore, as the road dries out and sets it should have careful attention after it is completed to determine whether it is necessary to add any more sand or clay. If there is too much clay there will be a tendency for the surface of the road to get sticky or muddy in wet weather and for the clay to ball and cake, and if this is the case a thin layer of sand should be spread over the surface. On the other hand, if the surface of the road loosens in dry weather, it is an indication that the clay that has been used is not a good quality of clay and does not have sufficient binding power. More clay should be added and worked into the road.

Drainage is one of the most essential features in road construction and it is very true in connection with the construction of the sand-clay road that it shall have good drainage. Where the subsoil is a sandy one it usually affords a pretty good natural drainage; and where there is considerable depth to the sand, usually the crown of the road is all the drainage that has to be done. It is necessary, however, in all cases that the water be taken out of the side ditches just as rapidly as possible. Where the subsoil is a clay, very careful attention must be given to the question of getting rid of the surface water. Also in clearing the right-of-way for the road, all stumps, logs, and other vegetable matter should be taken out of the roadbed for, if not, after the sand-clay mixture has been made, wherever vegetable matter exists it will as it decomposes make moisture and loosen and soften the sand-clay construction. Proper drainage is, therefore, very essential in the construction of the sand-clay road, and it should be maintained at all times.

Dirt and Loam Base.

Where the roadbed is composed of dirt and loam, it

will be necessary to haul both the sand and clay. The surface should be about the same shape as that where sand is added to a clay base, except a little lower between the shoulders, for practically all the material added will build up the crown of the road, but very little becoming incorporated with the original surface.

Add 4 inches of sand to the road, then $2\frac{1}{2}$ to 3 inches of clay, harrow thoroughly, and then add 4 inches more or sand and harrow thoroughly. Best results will be obtained if the materials are thoroughly dry when mixed, filling, harrowing, and shaping of road same as when sand is added to clay-base.

Quantity of Sand or Clay.

The following figures regarding the quantity of clay necessary to add to a sand subsoil to make the sand-clay road, and the amount of sand necessary to add to a sand subsoil to make the sand-clay road, and the amount of sand necessary to add to a clay subsoil will be of interest.

If the roadbed is nine feet wide on a sandy subsoil and the clay is added to a depth of 4 inches, it would require 570 cubic yards of clay to cover a mile of road. For a sixteen foot road it would require 1,050 cubic yards of clay. If the clay is a first-class plastic clay free from sand and only 3 inches of clay were needed, this would require 441 cubic yards for a mile of nine foot road, and 787 cubic yards for a mile of sixteen-foot road.

If the roadbed has a clay subsoil and sand is added to a total depth of eight inches, it would require 1,173 cubic yards per mile for a nine-foot road, and 2,085 cubic yards for a mile of sixteen-foot road.

The actual cost of the construction of the sand-clay road for any section can readily be determined by

knowing the distance the sand or the clay has to be hauled and the cost of labor and teams per day.

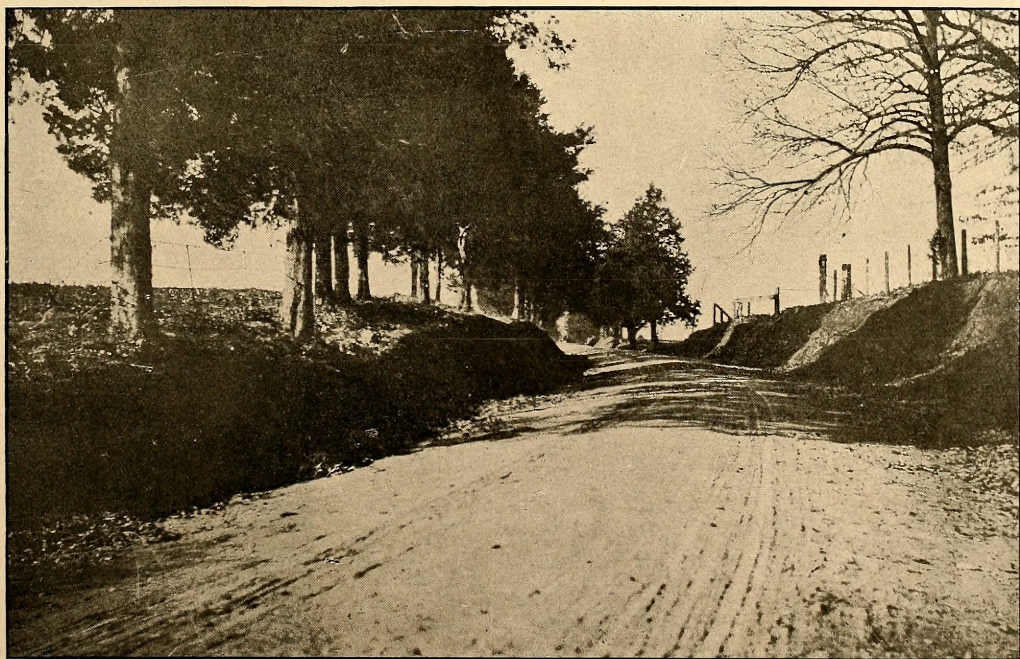
Summary—Clay Base.

1. Have the top of the clay grade smooth and about four or five inches lower than it will be when finished.
2. Plow and harrow the top for the width the sand is to be put on, leaving loose but smooth, with no big lumps.
3. Spread an even layer of sand about four inches deep over the top and plow and harrow.
4. Spread four more inches of sand over the top and harrow and drag thoroughly.
5. Use clean coarse sand, even if it has to be hauled some distance.
6. When possible, harrow just after a rain.

Sand Base.

1. Smooth the sand road, leaving it perfectly flat.
2. Spread the clay the desired width and from three to four inches thick.
3. If the sand base is clean sand, drag it up on the clay for a thickness of four inches and plow, harrow and drag thoroughly, preferably after a rain.
4. If the sand base contains loam haul clean sand from a pit.
5. Use natural sand-clay mixture in preference to pure clay.

As I stated at the beginning of this paper: Occasionally a natural mixture of sand and clay have been found in the right proportion and of the right quality to make a hard surfaced road. Where such materials have been found in the fields adjoining the highway and have been used in surfacing it, the mixture has been called "topsoil dressing" and the resultant road



ON THE CENTRAL HIGHWAY

Fine Piece of Top-Soil Road Between Hillsboro and Durham in Orange County, North Carolina. Part of the Central Highway. It was built Under the Direction of R. I. Brown, County Highway Engineer of Orange. This Piece of Road Runs Through Gen J. S. Carr's Famous Occaneechee Farm

a "topsoil" road. In reality, however it is a sand-clay road and we have simply used a mixture of the sand and clay which nature has provided.

In using this natural mixture the surface of the road should be prepared the same as for a road where both sand and clay are added.

This natural mixture of sand and clay should be added to a depth of 8 inches to 12 inches, according to the character of the subsoil, a sandy subsoil requiring the greater amount. After the material has been spread it should, if possible, be harrowed when wet and then dragged. If a spreader has not been used, or if the material has not been raked, a road machine will quickly cut out the greater part of the unevenness, and the drag will finish it.

Occasionally a condition is found where there is plenty of good clay but no sand. In some such cases it has been noticed that there is considerable white quartz, or sometimes trap rock in the vicinity. I believe then it is a feasible proposition to make our own sand by crushing the quartz or trap rock and construct a sand-clay road. In such a case I would use material that would pass a 3-8 inch screen and catch on a 1-8 inch screen.

This will increase the cost of the sand-clay road, and its economical use will depend upon the total cost of the road as compared with other surfacing materials.

Dust Prevention and Binders.

The life of the sand-clay road can be increased by using certain commercial binders.

It is believed that Glutrin and certain of the light asphaltic and other oils can be used on the sand-clay

roads not only to prevent dust but also to harden the surface and make it more resistant to water.

Maintenance.

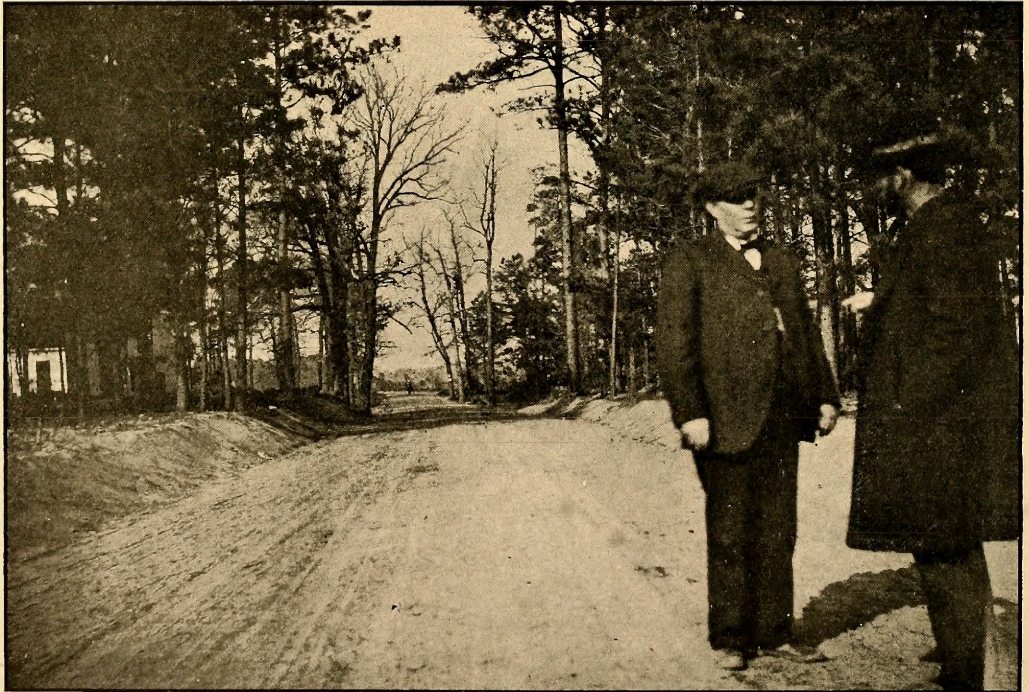
While the maintenance of a sand-clay and topsoil road is very easy and can be done at low cost, yet it must be constant and systematic. The road drag of the split-log type is the most efficient machine. This should be used just after a rain, as the road is beginning to dry out. The principle of the drag is not to cut and move much material but to push and smear material and pat it down in the small depression that may have formed on the surface of the road.

Laying Plans for Meeting of American Road Builders' Association.

Plans for the eleventh annual convention and the sixth annual good roads show to be held in connection therewith were discussed at a special meeting of the board of directors of the American Road Builders' Association held in Montreal May 20th. This meeting had been called owing to the attendance of a large number of the directors of the association at the First Canadian and International Good Roads Congress held in Montreal during the week of May 18th.

The program covering the annual convention and show is now being prepared by the program committee. The list of speakers will include the men who are known the country over as the leading experts in their respective lines.

The city of Charleston, W. Va., has voted bonds for \$300,000 to build 10 to 12 miles of streets.



U. S. Object Lesson Sand Clay Road in Edgecombe county, built under the supervision of E. O. Hathaway, U. S. Engineer. the man in the overcoat. The other man is Mr. T. P. Jenkins, former road supervisor of Edgecombe.

Scenic Highway Between Tryon and Saluda

By **SYLVESTER EDMONDS**

POLK COUNTY, situated in the western part of the state, is one of the sparsely settled counties of North Carolina. Here are encountered some of the greatest difficulties to road building to be found in the state—and that means, virtually, in the South, for in the rugged hills of western North Carolina good roads are extended against the greatest odds of baffling obstacles met with in southern road building. The county is divided topographically in two sections. Out of its rolling farming land the Blue Ridge Mountain rise abruptly. The ascent from the lower plain of the southern and eastern parts of the state to the high mountain plateau of the western division is made in a few miles' hard climb in Polk county.

Once up into the mountains the going is much easier. It is in the abrupt rise from the lower to upper plain that the highest, steepest and rockiest mountain sides are to be found. Right here, when, centuries ago, the upheavals of mother earth threw the present Blue Ridge Mountains out of the level plain, were left the greatest barriers of the section to the progress of man. As a natural sequence to the characteristics of this immediate section, which make it hard through which to build roads, when built, these roads run through the heart of a most wonderfully beautiful country.

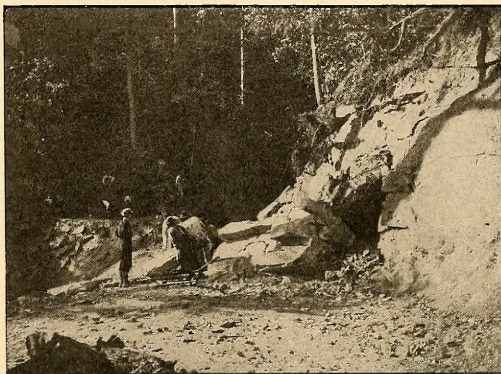
The county recently issued bonds to the amount of \$100,000, which amount is being used in the construction and improvement of about eighty miles of roads. Owing to the unusually heavy nature of the work to be done most of it has been put under contract with private concerns by the different townships of the county. Where this policy is not followed, day labor, under a township foreman is used.

The most notable road work of the county at present is the construction of the highway between Tryon and Saluda. These towns each stand at the edge of one of the two main divisions of the land of this section. Tryon is at the foot of the Blue Ridge. Directly to the south and east the land is gently rolling. The massive sides of the mountains appear to the north and west, rearing themselves majestically out of the plain and ranging protectingly about the town nestled in their lap.

Nine miles away Saluda stands at the top of the sharpest climb. Beyond, the ascent is comparatively moderate. The peaks above rise much more gradually and individually not so high as in the belt of the plateau's edge. Saluda is 1,000 feet higher than the land five miles to the south toward Tryon.

The road between these towns is unique in many respects and of unusual interest owing not only to its own nature, but to the object of its construction and the purpose it will fulfill. It is, according to information from a responsible source, the only first-class highway tapping the main artery of the Blue Ridge. The road will supply a pressing need in connecting the mountain section of western North Carolina, Tennessee and the country above with the lower south—South Carolina, Georgia and Florida. This remarkable piece of road forms the heretofore missing link in the chain of highways opening these sections—the upper and lower—to the inter traverse of them over the open road, a mode of travel becoming ever more popular. It is a source of income, nourishing the development of a territory much broader than that touched by its entire length.

The road from Tryon runs into the Pacolet Valley, a short distance from the town. Where it enters, the valley is broad and level. Peace is the predominant element of the scenery at this stage. Mountains rise, rank after rank, softened by distance. Straight ahead, beyond the head of the valley, is visible in one ridge above another, always rising, but nevertheless distinct, a deep, sharp gap. That is where the Pacolet river has cut a channel through the barricade of the mountains. Of this work of nature the ingenuity of man has taken advantage. Along the precipitous sides of the Pacolet gorge, ridged by tributary streams into the likeness of a huge saw, the road winds. Below, the crystal waters of the Pacolet River plunge and foam in rushing cataracts and between huge boulders. Across the gorge, streams dash themselves from the brink and fall a spray into the river. Others tumble from over-



Showing difficulties of construction along Tryon-Saluda road

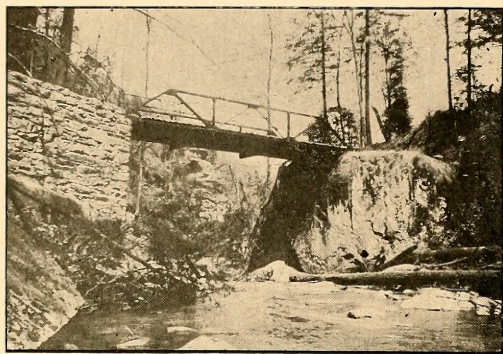
head, break on rocks by the roadside, are conducted under it by culverts or are spanned by bridges and from thence drop to the gorge bottom. The flora is of diversified luxury and adds a charming touch of intimacy to the mountains' grandeur. Among the towering hills and primeval forests through which it runs, the road appears from a distance, like a slender, curving band of metal, clasping the mountains. On closer view an idea of the labor and skill necessarily employed in its construction is gained at a glance.

Grading and filling of the heaviest kind was done the entire distance in the mountains. In many places a solid bank of rock had to be blasted through. Several carloads of dynamite and powder were used in a few miles on the mountain highway. The cost per mile on this part of the construction went as high as \$15,000. The road from five miles south of Saluda into the town cost \$45,000 to build. In that distance a rise of 1,000 feet is made between Tryon and Saluda, the short distance of nine miles. Grading is supplemented by 13 steel bridges and 2,500 yards of first-class masonry. The specifications call for a road 20 feet wide, rounded and sanded.

A short distance below Saluda the road tunnels the tracks of the Southern Railway 60 feet below the rails. The tunnel is 160 feet long, built of arched concrete.

It was constructed by the Southern Railway Company at a cost of from \$20,000 to \$25,000. Two floor levels of the tunnel are necessary owing to a considerable stream which flows through it. The stream level is three feet below the level of the traffic floor.

It is remarkable that this road, over the most rugged



Section of the Tryon-Saluda Highway showing character of the iron bridge used and method of construction

mountain, maintains much better mean and maximum grades than are to be found generally on roads over low rolling land. The average grade from Tryon to Saluda is slightly over 2%. Nowhere does it exceed 6%, and is that steep for only a short distance—this over country so rough that the engineers surveying the route made their way with difficult and along the face of mountain sides so sheer that even a foothold was extremely precarious.

This bit of highway alone is a monument to the pluck and enterprise of the county and more especially to



Section of the Tryon-Saluda Highway, cut into the mountain side

those members of the county highway commission who pushed the perilous undertaking through in spite of violent objection from less progressive men.

Miles of road are being constantly brought to a higher stage of efficiency in the best way possible with the county's funds. Two methods of surfacing the roads have been tested; sanding, and top soiling. Thus far the top soiling has proved more satisfactory. There is yet much room for improvement in the roads of the county, but that room is being filled as fast as possible

with the means at the county commissioners' demand, by a network of good roads covering the county.

The roads improve the opportunities of present residents and do more—they open to people of all sections opportunities for touring and settling in a country richly endowed by nature with the attributes requisite to man's prosperity and happiness: excellent agricultural and manufacturing locations, gorgeous scenery, ideal climate with pure, bracing air and clear spring water in abundance from the high, uncontaminated divides.

Rural Carriers and Good Roads.

The rural carriers are among the most enthusiastic advocates for good roads that we have in North Carolina, and many of them are devoting a good deal of time and energy to obtaining better roads in the communities in which they live. With better roads, more of



THOMAS V. HOWELL

A Rural carrier of Anson County. He is a live good roads man and will attend the Durham Convention

the carriers will be in a position to utilize the motor-cycle and small automobile in the delivery of their mail, thus increasing the efficiency of the rural delivery.

One of the carriers, who has always been a good roads enthusiast, is Mr. Thomas V. Howell of Peachland, and there is given on this page a picture of Mr. Howell on his motor-cycle, as he travels through Anson county delivering the mail.

Road district No. 2 of De Soto county, Florida, votes this month on a road bond issue of \$40,000. Road district No. 5, of the same county, will vote on a bond issue for roads of \$350,000 on June 23rd.

Sevier county, Tenn., has awarded contracts for the grading of 60 miles of roads and the macadamizing of 30 miles at a cost of \$168,563.

The Hickory Nut Gap Road

By **JOSEPH HYDE PRATT**

State Geologist

THE HICKORY NUT GAP road is a link across Henderson county of the Charlotte-Asheville highway. This link, extending from Rutherford county to Buncombe county at Hickory Nut Gap, a distance of 7.2 miles, when finished, will practically complete the Charlotte-Asheville highway, as funds are available or contracts let for the construction of all the other links of this highway.

This particular link of the highway is the most expensive to build, and, when completed, will probably

supplement the work of the convicts, and a local committee was appointed to take up the matter of raising funds. The members of the committee are as follows:

Dr. M. H. Fletcher, Asheville, N. C.
S. B. Morse, Hendersonville, N. C.
J. L. Ashworth, Fairview, N. C.
Dr. C. M. McCracken, Fairview, N. C.
J. M. Lyda, Edneyville, N. C., R. F. D.
C. W. Keeter, Rutherfordton, N. C.
John Nichols, Rutherfordton, N. C.
F. L. Flynn, Uree, N. C., R. F. D.
C. Oates, Bear Wallow, N. C.
M. L. Williams, Bat Cave, N. C.
W. F. Pryor, Bear Wallow, N. C.
J. B. Freeman, Bat Cave, N. C.
J. M. Flaek, Bat Cave, N. C.

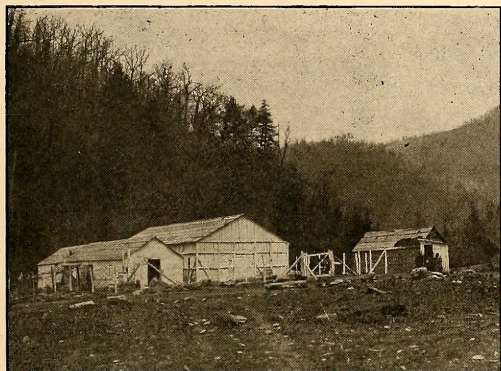


Fig. 1.—A view of the convict camp at Bat Cave

be one of the very best portions of the road. It will also be, perhaps, the most scenic portion.

For sometime after the Charlotte-Asheville highway was planned, it seemed as though the Hickory Nut Gap link would prevent the early construction of the highway. Henderson county, as a county, could not be prevailed upon to interest itself in this link as a county highway, inasmuch as it crosses the very extreme northeastern jog of the county, and would not bring directly any travel to the main portion of the county itself. The link is, however, of great importance to Rutherford and Buncombe counties, as the road is traveled very largely by farmers of Rutherford county, hauling their produce to Asheville and other points in Buncombe county.

One attempt was made to build this road as a toll road, and a company was incorporated for this purpose; but nothing was done toward building the highway.

The North Carolina Geological and Economic Survey made a survey for the location of this link of the highway, and found that a good location could be obtained having no grade over $4\frac{1}{2}\%$. The general assembly of North Carolina of 1913 passed an act "To Provide for the Construction of the Hickory Nut Gap Road." By this act the state was to furnish as many convicts as practicable to be used in the construction of the road which was to be located by the North Carolina Geological and Economic Survey and be constructed under the supervision of one of its engineers. According to this act 50 convicts were detailed early in August, 1913, for work on the Hickory Nut Gap road. It was realized at the start that funds must be available to



Fig. 3.—Convicts at work on the Hickory Nut Gap Road

Mack Whiteside, Uree, N. C.
L. Logan, Chimney Rock, N. C.
R. E. L. Freeman, Gerton, N. C.

Through the efforts of this committee there has been raised thus far \$2200 in cash, and subscriptions of labor and teams amounting to \$600 or \$700. In addition to the above the township of Edneyville voted \$1500 in bonds for use on this particular road.

The first convict camp was located on the banks of the Broad River near Bat Cave. (Figure 1.) Very

comfortable quarters were arranged for the convicts, guards, and superintendent. The second camp was located at Craig bridge, about 2 miles above Bear Wal-low post office.

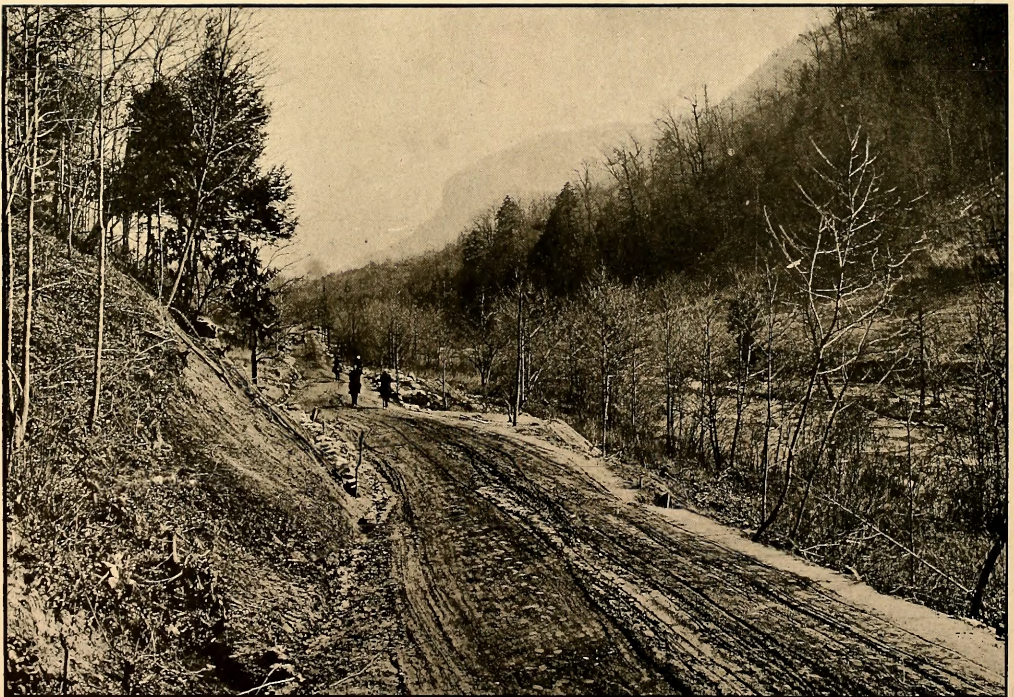
The construction was first under the supervision of Mr. J. B. Clingman, one of the highway engineers of the North Carolina Geological and Economic Survey; but he was soon transferred to Madison county and the Hickory Nut Gap work was put under the supervision of Mr. J. C. M. Valentine. The road is being built with no grade over $4\frac{1}{2}\%$, and with a width of 24-feet except in rock ledges, where the width is narrowed down for short distances. Permanent rock culverts are being installed wherever possible, and where this cannot be done temporary oak culverts are put in until such time as concrete or other permanent culverts can be installed. The number of convicts from the camp that have been available for road work have averaged about 34. (Fig 3.) Although 50 were sent to the camp, for one cause or another, the number has been decreased to 44, and of these several are cripples, thus incapacitating them for work on the road.

The work was commenced at the Rutherford county line, and there has now been built about 3.1 miles. This portion of the work, however, is by far the heaviest, and one-half of the construction work has been finished, although considerably less than one-half of the mileage has thus far been completed. Portions of the road have been covered with sand-clay or gravel, and all of the surface will be treated in this way before the road is finished. In some places the hillsides are so steep that every bit of the roads constructed has to be cut into the hillside, as none of the material excavated can be used for making the road. This is well illus-

trated in Figure 6. The cost of the excavation has averaged approximately 19 cents per cubic yard, and in making this calculation the value of the convict labor has been reckoned at \$1.00 per day per each convict. This compares extremely favorably with any contract work or any road excavation work done by day labor. All the bridges have been built with convict labor and this includes the iron bridge over Broad River. See (cover picture and Fig. 5.)

There is probably no section of North Carolina that needed a good road more than this section of Henderson county; (see fig. 7); and, although the people were not able to construct this highway themselves, they have been ready to assist in every way they could to make its construction possible. As stated before, it is a highway that actually benefits the two adjacent counties perhaps more than the county through which the link itself happens to pass. There is perhaps no road in North Carolina that has been backed by more enthusiasm and generosity than this Hickory Nut Gap road. Several sections have made considerable sacrifice to raise what was considered their part of the money needed to supplement the work of the convicts and several men have been tireless in their efforts to raise subscriptions for this work. To the untiring endeavors of Dr. M. H. Fletcher of Asheville is due the fact that the funds have been available to carry on this work from month to month. While the larger proportion of the money has been raised in Asheville, yet the Fairview section of Buncombe county and the people all along the route from the Gap to Rutherford county, and in the Chimney Rock section of Rutherford county, have added their part to the road fund.

While it is an expensive road to build yet the work



Looking down Broad River toward Chimney Rock on the Hickory Nut Gap Highway

itself has been done very cheaply, and every dollar that has been raised for the road has been spent, it is believed, in the most economical way for the best interest of the road. Those who have passed over that portion of the road that is completed are warm in their praise

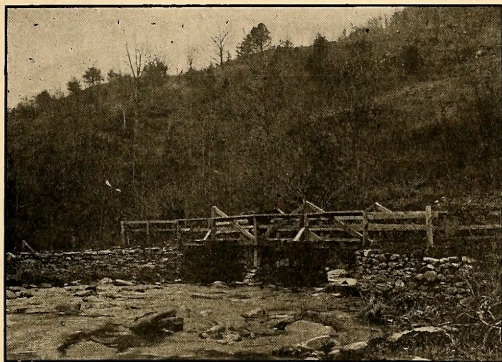


Fig. 5.—A bridge on the Hickory Nut Gap road built by convicts

of the work done, and one prominent state official asked if we were not building too good a road. The Hickory Nut Gap road is a state road, built by state convicts under the supervision of a state department; and, when completed, it is believed it will be one of the finest pieces of road in North Carolina and built as cheaply as any mileage of road.

Governor Craig in speaking of this highway stated: "It will not only be of benefit to Asheville and Charlotte and all the territory adjacent to the highway, but it will mean a great deal to the entire state; since it will result in the linking together of the central and western portions of North Carolina by a highway that can be used in all seasons of the year. The importance



Fig. 7.—Type of road that is being eliminated in the construction of the Hickory Nut Gap Road

of this road to Rutherford county cannot be over-estimated, inasmuch as it makes it possible for the citizens of the western part of that county to transport their farm products over a good road to Asheville, which is their best market."

Figure 9 is a camping scene along the highway showing farm wagons en route back from Asheville, Buncombe county. (See page 21.)

The county commissioners of Buncombe county are arranging to move their convict camp near Hickory Nut Gap, so that they can during the next six weeks or two months grade the road from the gap to the foot of the mountain. When this is completed the road can be used by automobile from Charlotte to Asheville or Asheville to Charlotte. The commissioners have passed a resolution that the convicts are to be kept on the Buncombe side of the highway until the grade is completed to the surfaced road just beyond Fairview.

In Rutherford county, contracts have been let for the construction of the highway across that county, with the exception of the last five miles extending to the Henderson county line. This five miles is being constructed by the county convict forces.

By the end of the year the Charlotte-Asheville Highway should be completed and surfaced throughout its entire distance.

When the Hickory Nut Gap road is completed the boards of county commissioners of Buncombe, Henderson, and Rutherford counties shall appoint one man each from their respective counties, who shall be a member of the Hickory Nut Gap Road Commission,

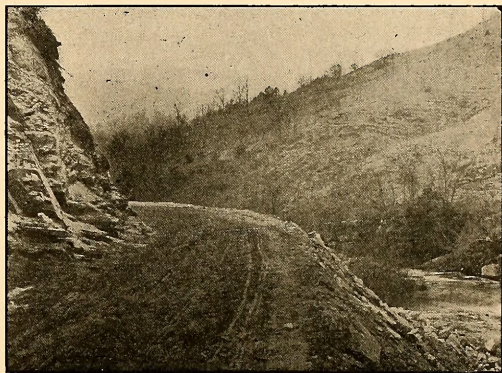


Fig. 6.—Section of the Hickory Nut Gap Road looking down Hickory Creek

whose duties it shall be to provide the means for and supervise the maintenance of said road. This commission is to estimate the amount that it will take to maintain the road in good condition for the current year and apportion this amount equally between the three counties; and it shall then become the duties of the boards of county commissioners to appropriate out of the general treasury of their counties the amount ordered. This means that, after it is constructed, the Hickory Nut Gap road will be maintained.

When present contracts in the city of Baltimore have been completed the city will have spent \$3,000,000 for 75 miles of improved streets. It is stated that since 1911 the city has replaced 1,000,000 square yards of cobblestones with sheet asphalt, granite blocks and vitrified brick. The work is to continue until the entire city is paved and the estimated cost is \$10,000,000. It is expected that it will take 10 years to complete the work.

Wythe county, Va., will construct four miles of macadam.

The city of Chattanooga has contracted for paving amounting to \$36,259.

The Asheville-Charlotte Highway

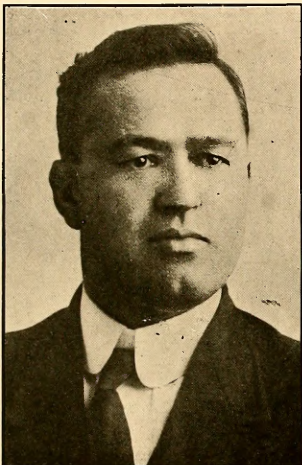
By N. BUCKNER

Secretary Asheville Board of Trade

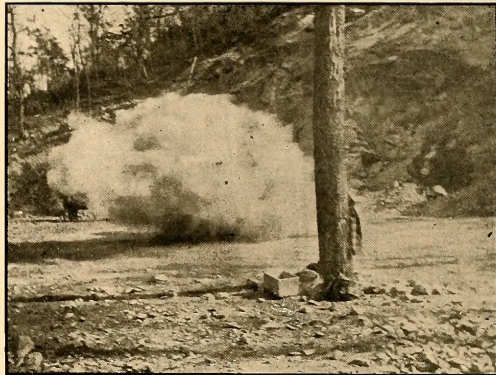
THE Asheville-Charlotte Highway enjoys the unique distinction of being the first public road in North Carolina on which state convicts were put to work. A force of fifty convicts from the penitentiary at Raleigh was established in a camp a Bat Cave, about twenty miles from Asheville, during the fall of 1913, to build the connecting link of this important scenic highway across Hickory Nut Gap Mountain, much credit being given Hon. Locke Craig, known over the state as the Good Roads Governor, and to Mr. H. B. Varner of Lexington, N. C., one of the state's foremost advocates of the good roads cause not only in North Carolina, but in the entire South, for securing legislation to make possible the working of state convicts on the public roads.

The work of surveying the road from the Rutherford county line across the corner of Henderson county

bed was cut out and macadamized a width of fourteen feet with an eight inch crown. A six inch layer of large stone was first put down and rolled; then a second six inch layer of smaller stone was put down, sprinkled and rolled, with an inch and a half top dressing of stone chippings sprinkled and rolled. The macadam extends across Mine Hole Gap, eight miles from



MR. N. BUCKNER
Secretary Board of Trade, Asheville, N. C.



Blast in a quarry in Buncombe county on the Asheville-Charlotte Highway

to the Buncombe county line in Hickory Nut Gap, 2800 feet altitude, is under the direct supervision of Dr. Joseph Hyde Pratt, State Geologist, of Raleigh, and rapid progress is being made in road construction although all the work of grading, hauling material, building culverts and constructing bridges is being done by hand entirely. A roadway of 22 feet from shoulder to shoulder is being constructed, with a 10 inch crown, under drains, with an extreme gradient $5\frac{1}{2}$ per cent. In many places where sand can be obtained the road is sanded on top, while in many other places it is blasted bodily from the solid granite cliffs along the mountain sides.

On the Asheville, or Buncombe county, side of Hickory Nut Gap Mountain is a large force of county convicts working toward the Gap, where the state and county forces expect to meet in July, opening the highway for the passage of automobiles into Asheville from the New York-Atlanta Highway at Charlotte. The road on the Asheville side of Hickory Nut Gap is macadamized for a distance of ten miles. The road

Asheville, where macadam was discontinued and the force put to grading road to the county line in Hickory Nut Gap in order to open the road for automobile traffic into Asheville by July 1st. The grade across Mine Hole Gap does not exceed $4\frac{1}{2}$ per cent, except for a distance of 3400 feet which reaches six per cent.

This highway passes through the Broad River Gorge, and Chimney Rock section, famous for its rugged grandeur and scenic splendor, which has heretofore been inaccessible, but with the opening of this new highway there will no doubt pour a steady stream of autoists through this rugged canyon into Asheville, famous as the good roads center of the southeast and the city of cordial and charming hospitality.

It is announced that the Sycamore Club, of Johnson City, Tenn., through Mr. C. L. Marshall, an eminent good roads advocate of that city, has taken up the matter of securing a good roads expert from the National Good Roads Department, through Congressman Sam B. Sells. Congressman Sells has just replied to Mr. Marshall that the matter had been referred to the agricultural department and that a good roads expert would be sent to Johnson City at no cost to the club, save his expenses while there.

Hard clay roads from Greenville to Madison, Florida, to the Jefferson county line have recently been built, and the town of Greenville is not lagging behind in the progress being made by West Florida towns.

J. R. Southerlin, who was awarded the good roads contract of Dade City, Fla., district, will begin the construction of roads soon. About forty miles of good roads will radiate in six directions from Dade City.



After the blast in the quarry on the Asheville-Charlotte Highway in Buncombe county

Road Revenue by Bond Issue in N. C.

By MISS H. M. BERRY

Secretary North Carolina Geological and Economic Survey

Within the past several years, there has been much agitation throughout North Carolina for good roads. This has resulted during 1912-13 in the voting of many bond issues for permanent road improvement by a



MISS H. M. BERRY

Secretary North Carolina Geological and Economic Survey, Assistant Secretary North Carolina Good Roads Association

great many of the counties and townships, as follows:

Anson county—a bond issue of \$50,000 in 1912; another of \$50,000 in 1913.

Beaufort—\$50,000 in 1913, authorized by legislative act.

Brunswick—\$40,000 in 1913.

Buncombe—\$50,000 in 1913.

Burke—\$50,000 in Morganton township, 1913.

Cabarrus—\$105,000 in 1912.

Caldwell—\$25,000 in Lovelady township, 1913.

Carteret—\$10,000 in Morehead township; \$3,000 in Newport, 1913.

Catawba—\$50,000 Hickory township; \$50,000 Newton township, 1912.

Cherokee—\$187,000 in Valleytown, Murphy and Marble townships, 1912.

Cleveland—\$60,000 in 1913; Kings Mountain township, \$15,000 in 1913; No. 6 township, \$25,000 in 1912; No. 7 township, \$50,000; No. 3 township, \$50,000 in 1913.

Davie—\$175,000 in 1913.

Duplin—\$20,000 in Warsaw township; \$20,000 in

Rose Hill; \$15,000 in Faison; \$5,000 in Calypso; \$5,000 in Wallace, all in 1912.

Edgecombe—\$200,000 in districts 1, 2, 3, 4, 5, 8, 9, 10, 11, all in 1913.

Franklin—\$20,000 in Franklinton township in 1912 and \$20,000 in the same township in 1913; \$15,000 in Youngsville, 1912; \$40,000 in Louisburg, 1913.

Granville—\$40,000 in 1912.

Greene—\$180,000 voted in 1913 by all townships except three.

Halifax—\$60,000 in Enfield; \$40,000 in Halifax in 1913.

Haywood—\$50,000 in Waynesville, 1912.

Henderson—\$25,000 in 1913; \$12,000 in Edneyville; \$50,000 in Hendersonville; \$20,000 in Hooper's Creek, 1913.

Iredell—\$400,000 in 1912.

Jackson—\$30,000 in Cullowhee; \$15,000 in Dillsboro; \$30,000 in Sylva, 1913.

Lee—\$100,000 in 1912.

Lincoln—\$200,000 in 1913.

McDowell—\$50,000 in Marion township; \$10,000 in Nebo; \$20,000 in Old Fort, 1913.

Macon—\$100,000 in Franklin township, 1913.

Madison—\$10,000 in Mars Hill, 1912; \$300,000 in 1913, by act of the legislature.

Martin—\$50,000 in Robersonville, 1913.

Moore—\$12,500 in Deep River; \$10,000 in Greenwood; \$10,000 in Mineral Springs, 1913.

Nash—\$20,000 in Rocky Mount in 1912; \$50,000 in Mannings, 1913.

New Hanover—\$350,000 in 1913, including \$250,000 for bridges.

Onslow—\$10,000 in Jacksonville, 1913.

Orange—\$250,000 in 1912.

Pitt—\$50,000 in Greenville, 1913.

Polk—\$100,000 in 1913, by act of the legislature.

Richmond—\$10,000 in Beaver Dam; \$5,000 in Black Jack; \$15,000 in Marks Creek, \$5,000 in Mineral Springs; \$25,000 in Rockingham; \$15,000 in Steeles; \$25,000 in Wolf Pitt, all in 1912.

Rutherford—\$250,000 in 1913.

Sampson—\$10,000 in 1912; \$100,000 in 1913.

Scotland—\$50,000 in Stewartville; \$30,000 in Williamston; \$30,000 in Laurel Hill; \$20,000 in Spring Hill, all in 1912.

Stokes—\$15,000 in Danbury township; \$40,000 in Meadows; \$50,000 in Sauratown, all in 1913.

Surry—\$5,000 in Mt. Airy township, 1912; \$80,000 in Mt. Airy township in 1913.

Vance—\$200,000 in 1913.

Warren—\$50,000 in Warrenton township, 1913.

Wayne—\$40,000 in Brogden, 1913; \$100,000 in Goldsboro 1913.

Yancey—\$150,000 in 1913.

This shows a total of \$1,682,000 in bond issues for 1912 and \$3,747,500 for 1913.

Of the \$1,682,000 of bonds voted in 1912, probably not over four-fifths of it has as yet been spent; and of the \$3,747,500 voted in 1913, only a comparatively small amount has been sold to date. So that at the present time in the various counties and townships which have voted bonds, there undoubtedly remains to be spent at least \$3,000,000. Whether this will be spent

to the best advantage will depend largely on the action of the next legislature in furnishing the means for the establishment of a State Highway Commission, so that competent engineering assistance can be given to these counties and townships. An expenditure of say \$50,000 on the part of the state will undoubtedly save to the counties many hundreds of thousands of dollars.

The state geologist has steadily advised against the issuance of bonds by townships, because:

(1). The township bond issue must of necessity be small as compared with a county bond issue, be harder to sell, and bear a higher rate of interest.

(2). When sold, if the best results are to be obtained, a large portion of it would have to be used in paying an engineer, and the resultant mileage would not meet the expectations of the people voting the bonds.

(3). If spent without the assistance of an engineer and improperly located roads are surfaced, the money is practically thrown away, as the only permanent part of a road is its location.

(4). If the money is economically expended, a system of roads built for the township, and good results obtained, the township is still in bad condition inasmuch as it is limited to local travel; and, in order to get into adjacent townships or counties, the citizens of the township voting the bonds would have to travel over bad roads, and really lose the benefit of their own roads because they would have to regulate their loads according to the bad roads of their neighbors.

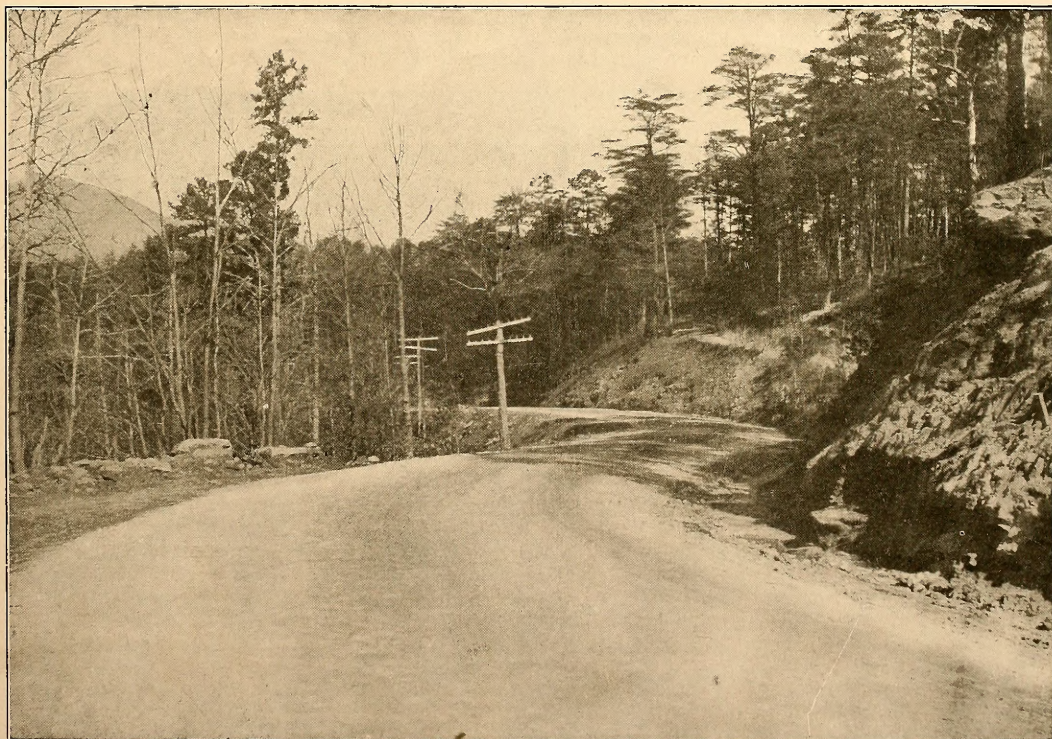
So that we see the building of good roads is not a local matter and can never be so; because roads belong to the public generally and may be traveled over

by people living along them, by people from neighboring townships, by people from neighboring counties, and by people from other states and countries.

We must systematize and standardize our methods of road financing, location, construction and maintenance, if we would eliminate the evils attendant upon bad roads.

Prevost Hubbard, Assoc. Am. Soc. C. E., in Charge Division of Roads and Pavements, the Institute of Industrial Research, Washington, and Lecturer in Highway Engineering Chemistry at Columbia University, and Arthur H. Blanchard, M. Am. Soc. C. E., Consulting Highway Engineer, and Professor in Charge of the Graduate Course in Highway Engineering at Columbia University, have been elected by the Council of the International Association for Testing Materials the American members of Commission No. 58 on "Standardization of Methods of Testing and Nomenclature of Road and Paving Materials."

President Perry Nicely and Commissioners J. W. Owens and Charles Myers of the Wood county court, West Virginia, and County Engineer Burdette Woodyard went to Detroit, Mich, last month for the purpose of inspecting the model concrete roads in the vicinity of that city including the roads in Wayne county, Michigan. The purpose of this trip of inspection was to give the members of the court and the engineer further practical experience in road building in order that they may be better able to carry on the work in Williams district.



A beautiful macadam road near Tryon, N. C.

The Central Highway in Madison County

By JOSEPH HYDE PRATT

State Geologist

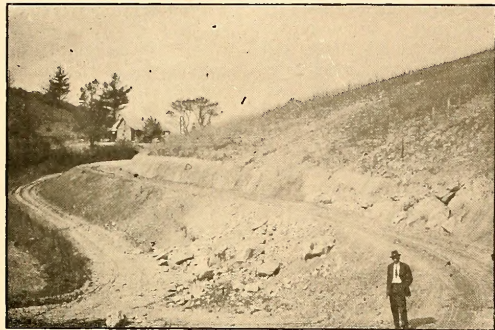
WHEN the General Assembly of 1911 of North Carolina authorized the construction of the Central Highway, which was to extend from Beaufort Harbor to the Tennessee line, and when Madison county was

on the people of Madison county to such an extent that the county got a severe case of good roads fever which resulted in the county passing a bond issue of \$300,000 for the construction of good roads. Even before the bonds were sold, they started in the right way to accomplish the best results from their bond issue by employing a competent road engineer to take charge of their road work.

Ever since the construction of the North Carolina railroad, the eastern and western sections of the county have been separated from each other with practically no communication except by railroad, due to the fact that the railroad, when built, took the location of the old stage coach route down the valley. The state had to a certain extent obligated itself to replace the highway when the railroad was built, but up to a year ago had not constructed for the county more than a mile and one-half.

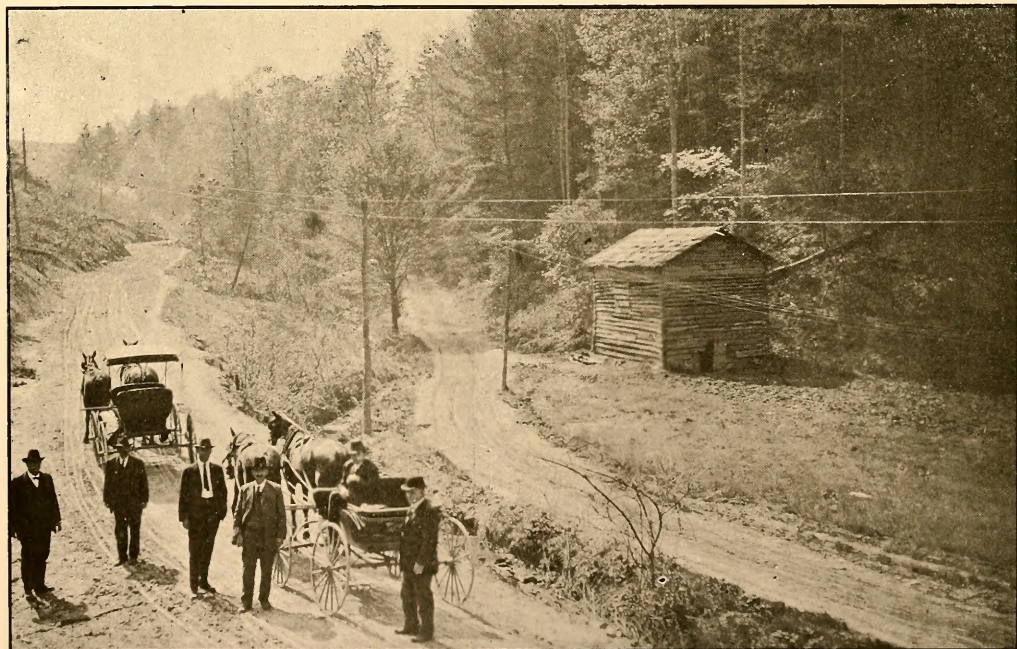
The General Assembly of 1913, realizing to some extent its obligation, passed a bill authorizing the State Penitentiary Board to furnish a certain number of state convicts to assist in building the road across Madison county. In accordance with this act, 42 state convicts were detailed for work in Madison county early in September.

They began their work near Walnut; and, after building approximately three miles of road in this section of the county, they were transferred to a point near the Tennessee line, and are now constructing a portion of the central highway from the Tennessee line



Part of Central Highway near Walnut Hill in Madison County. Note the old road at the left

to be included as one of the counties through which the highway was to pass, many were skeptical as to whether Madison county would be able to arrange for the building of her link of this highway. The passage of this act and the comments caused thereby re-acted up-



A section of the Central Highway in Madison county. It was built by state convicts

towards Hot Springs. It is expected that they will be able to complete the road to Hot Springs by the end of the year, and that the portion of the Central Highway between Hot Springs and where the convicts have finished the work near Walnut, will be let to contract. From the eastern end of the Walnut section of the

demand, and which should bring in hundreds of thousands of dollars to the county each year.

GOOD ROADS OF POLK COUNTY, NORTH CAROLINA.

By G. B. Cobb.

The enterprising little county of Polk in North Carolina, its southern boundary being South Carolina, is surmounting obstacles that have heretofore barred the way between the south and the north for direct travel over the Blue Ridge mountains for horse vehicles or automobiles.

It has within a year spent over \$100,000 in connecting its towns by well graded sand-clay roads; and its two most populous towns, Tryon, in the Paolet Valley and Saluda 1,000 feet above at the top of the ridge, have for years only been connected by a circuitous roundabout dirt road, steep in grade and narrow in width, until now, a roadway has been blasted out of the rockribbed mountain side, through a deep gorge that shortens the distances and makes an easy grade, where heretofore road building seemed very impracticable.

The distance through this gorge is about 5 miles, where earloads of explosives have been used to tear out from the rocky slopes a roadway 20 feet wide and at a grade not to exceed 6 per cent, and most of the way about 3 per cent.

In excavating there was moved about 9,000 yards per mile, about 50 per cent of which was rock.

Through this wonder gorge the road winds along the bank of the Paolet river and crosses it 4 times in about 3 miles, and in its winding crosses smaller mountain streams 9 times, all these 13 crossings being over steel bridges with over 2,500 yards of solid rock work abutments.

Going north from Tryon the road skirts the beautiful Paolet Valley for about 3 miles before entering the gorge that parallels the tracks of the Southern railway; high above on the opposite slope and passing under the railway tracks at Melrose, it winds up the west side of the gorge, and then again passes onto the east side 50 feet below the Southern tracks through a big rockwork culvert 160 feet long that bridges a small stream running lengthwise under the cemented culvert floor.

This culvert alone cost over \$24,000 and is of solid rock and cement laid by best masons.

Passing through this gorge the road rises about 200 feet to the mile, yet in all this distance has but one hairpin curve and that has a 50 foot radius, while all the other curves are simple ones of only 15 to 20 degrees or less.

The construction of this road was begun in the summer of 1913 and has been prosecuted continuously all winter, the mildness of our climate rendering outdoor work of this character possible with comfort in our coldest weather.

This roadway cut from the almost perpendicular sides of this rocky gorge is the wonder and admiration of all lovers of nature.

Towering hundreds of feet above on either side stands the primitive forest growth of gigantic trees, and flowering shrubs in great profusion.

This road will be completed and open for travel early in July, 1914, affording for the first time a convenient and practical route over the Blue Ridge via Spartanburg, South Carolina, through Tryon, Saluda, Flat Rock, Hendersonville to Asheville, North Carolina, and the entire northland, the most picturesque and scenic route conceivable.

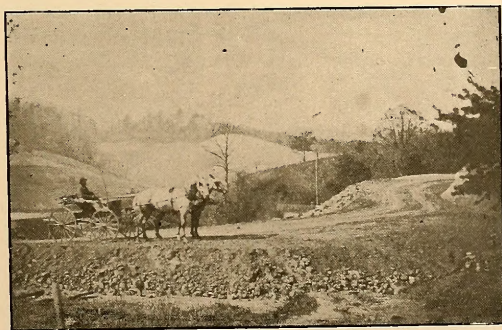


Fig. 9.—A familiar scene on the roads of Madison county

highway, a contract has been let for the construction of the central highway to Mars Hill township. From this point the road has been built to the Buncombe county line.

It is hoped that this highway, which will mean so much to Madison county, can be completed within the coming year. The character of the work that the state convicts are doing is illustrated in the photographs accompanying this article.

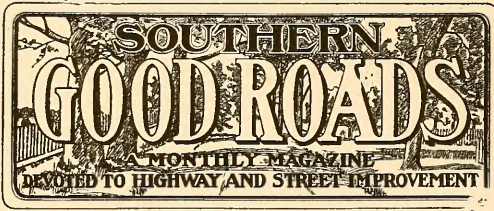
The bond issue will be sufficient to enable the county to extend roads from this main highway to nearly all portions of the county, so that it will be possible for the residents of Madison county to reach their county seat over a highway and not be compelled to go there by railroad or by horseback over trails. Madison county is to be commended for the step she has taken in road work, and should be an example to other coun-



Another view of the Central Highway in Madison County

ties much more thickly settled, which have greater available wealth, and which are doing little or nothing to obtain a system of good roads.

The construction of this system of good roads in Madison county will enable the county to develop its mountain resources, such as scenery, climate, and pure drinking water, for which there is an ever-increasing



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Official Organ of the Virginia Road Builders' Association

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VOL. IX. JUNE, 1914. No. 6.

A STATE HIGHWAY COMMISSION.

There is no doubt that there is a very strong sentiment throughout North Carolina for good roads and that the enthusiasm which has been aroused for the construction of good roads has developed to such an extent that it has awakened the people of North Carolina to the fact that it is not enough simply to provide funds with which to build roads, but that there must be an adequate and competent head to superintend these expenditures. The question immediately arises as to whether or not the road funds which are being provided by direct tax and bond issues can be spent to the best advantage by the many local bodies, or whether there should be a state or central body which would be in a position to supervise the construction of the roads of North Carolina. It is a demonstrated fact and one beyond dispute that no township, county or state can obtain a wise and economical expenditure of its road funds unless such funds are spent under the supervision of competent highway engineers.

The state has already recognized to a limited extent the need of giving engineering assistance to its counties; and such assistance can not be carried out to its fullest extent and the road funds subserve to the in-

terests for which voted, unless the state makes an adequate appropriation, so that the highway department can be in a position to give engineering assistance to any and all counties needing it.

There are now several highway bills before congress, some of which are being favorably considered; and there is no question but that a road bill will be passed carrying a rather liberal appropriation, which will be used in constructing highways in the various states. It is also true that no state can obtain the benefits of such road appropriations from the national government, unless the state has an adequate highway department through which the funds can be appropriated and expended. North Carolina would be able to benefit to a limited extent by such an appropriation on account of the highway department of the North Carolina Geological and Economic Survey, which has been organized by the general assembly. On account, however, of the small appropriation made to this department of \$5,000 per year, the state will be in a position to obtain but a very small appropriation of the fund that will be allotted to its use.

To accomplish the results desired and be in a position to obtain to the fullest extent the appropriations made by congress, the general assembly of 1915 should establish a State Highway Commission which should be non-political and whose work should be entirely for the interests of the public roads of North Carolina.

PISGAH FOREST.

North Carolina is to be congratulated upon the purchase by the federal government of the 87,000 acres comprising Pisgah Forest in western North Carolina. Southern Good Roads wishes to express to Mrs. Vanderbilt its hearty appreciation of her generous act in making it possible for the federal government to secure this forest.

It should forever remain "Pisgah Forest" in memory of George K. Vanderbilt, who named it and who has done more than any man in the south to create a sentiment for forestry. He was the first man to practice forestation in the Southern Appalachian region.

With its magnificent system of macadam roads already built and in use, the government will find Pisgah Forest ready for service as a playground for the people. In time Pisgah will be the greatest of our great national parks.

ROAD MAINTENANCE.

One of the crying needs in connection with the road problem in North Carolina to-day is for counties to provide a maintenance fund with which to repair roads after they have been built. No county should be permitted to issue bonds with which to build public roads, unless there is inaugurated in the act authorizing the bond issue a section making it obligatory upon the county to provide a maintenance fund with which to maintain or keep in repair the roads after they are built.

If such a provision were made, our people would be



HON. LOCKE CRAIG, GOVERNOR OF NORTH CAROLINA

much more favorably inclined to bond issues for road work than most of them are at the present time.

This question of maintenance applies to our dirt roads just as much as to the surfaced roads, and any county locating and grading a road, whether it is to remain as a dirt road or be surfaced, should provide an adequate fund to keep it in good repair.

The amounts per mile necessary to maintain our various types of roads are comparatively small, if the money is spent under the supervision of competent men. For a dirt road a county should provide \$15 per mile per year; for a sand-clay road \$30 to \$50 per mile; for a macadam road \$125 to \$200 per mile, these amounts depending upon the width of the road and the width of the surfacing material.

Making Preparations for the American Road Congress.

The first practical experiment in government maintenance of interstate highways, now being undertaken on the stretch of road from Washington, D. C. to Atlanta, Ga., will be well under way before the assembling of the American Road Congress at Atlanta November 9, according to an announcement made by the American Highway Association, last month.

Every state in the union and especially all the farmers and automobilists are awaiting the outcome of the experiment with keen interest in order to determine whether the government cannot, in this manner, aid in making the road improvement work of all the states homogeneous.

The American Highway Association, which originated the government's experiment, has already taken steps, in conjunction with the American Bar Association, to make the road laws of the different states more uniform, and the practical experiment on the road from Washington to Atlanta is designed to make the roads themselves more uniform and bring about continuity in improvement and maintenance.

Three automobiles, purchased by the American Highway Association, have been turned over to the engineers assigned to the Washington-Atlanta highway, and are now covering the entire stretch of mileage. The American Highway Association, which, with the American Automobile Association, holds its annual convention under the general title of the American Road Congress, is now confident that the experiment in maintenance will bear full fruit before November 9.

Arrangements are being made for tours over the road to the congress at Atlanta. Anticipating that the congress will be the largest ever held, more than fifty exhibitors have already applied for space in the auditorium in Atlanta, which has been set aside for the display of machinery and road material. The Mayor of Atlanta has arranged to close two of the streets adjoining the auditorium and build a roof over them for overflow exhibits.

The county commissioners of Georgia, who perfected their organization several weeks ago, intend holding their annual meeting in conjunction with the American Road Congress. The American Bar and American Bankers Associations will also be represented.

North Western Road Congress Oct. 28-31.

A road congress to be held in the Milwaukee, Wis., Oct. 28-31 that will bring to Milwaukee governors of seven states, Secretary of Agriculture Houston and hundreds of experts from all over the country, was de-

cided upon at the organization of the Northwestern Road Congress.

The organization, which has for its slogan "the solution of the good roads question and inter-state highways from practical and scientific standpoints," was formed at a meeting in the Hotel Pfister at Milwaukee last month. Present were representatives from Illinois, Michigan, Minnesota, Iowa, North and South Dakota and Wisconsin.

The congress will bring to Milwaukee the most important gathering entertained there for years. In the opinion of James P. Keenan, secretary of the Citizens' Business League, 3,000 delegates will attend. Delegates will be officially appointed by the governors, he says.

The following are the officers elected: President, Prof. T. R. Agg, head of highway engineering, Iowa State college, Ames, Ia.; secretary and treasurer, James P. Keenan, Milwaukee. The vice president will be appointed later. H. J. Kuelling, Milwaukee county highway commissioner, was chosen a member of the committee to draft by-laws. George D. Bartlett, secretary of the Wisconsin Bankers' association, and Mr. Keenan will assist in the forming of the constitution.

Virginia Bridge & Iron Company's Pension System.

The Virginia Bridge & Iron Company, of Roanoke, Va., keeping step with the most progressive industrial corporations in the land, has adopted a pension system for its employees. A fund has been set aside by the company for a pension fund and it will be invested in stock of the company or in some other income-producing security and the proceeds used to pay pensions to those employees of the company who have served long and faithfully. The rules governing the dispensation of this fund provide that all men who have been 20 years or longer in the service and have reached the age of 70 and all women who have had the same length of service and reached the age of 60, shall be retired on a pension. Any man may be retired on request who has reached the age of 60 and has been 20 years in the service and any woman may be retired at the age of 50, who has been with the company 20 years. There is also a provision for those who become incapacitated for service, after having served 20 years.

It is provided that no pension shall be more than \$100 per month nor less than \$12 per month. Pensions will be paid on the following basis: "For each year of service two per cent. of the average regular monthly pay received during the last ten years of service."

As will be seen readily this plan will provide a good living for those faithful employees of the company who have given their lives to the service of the company. This is a long step forward and it is to be hoped that other big corporations of the south will follow the example of the Virginia Bridge & Iron Company.

Hard roads have been built from Chipley, Fla., south, four miles, which is the starting of good roads to St. Andrews Bay, on the Gulf of Mexico. Jackson county is now building a hard road from Chipley west to Bonifay and when completed will give a continuous good road for miles in almost all directions leading to Chipley.

Southern Good Roads is in receipt of a catalogue of road and street paving machinery, showing the handsome line of the Iroquois Works—The Barber Asphalt Paving Company, Buffalo, N. Y. The booklet would be of interest to every road official and road contractor in the land.

Cement Clay Gravel in North Carolina

By F. J. McGUIRE, Norfolk, Va.

The photograph on this page shows Haymount St., Fayetteville, N. C., constructed of cement clay gravel. The gravel from which this street was built was purchased from the Cape Fear Gravel Company, who own a large deposits of this gravel at Lillington, N. C. Lillington is located on the Raleigh, Charlotte and Southern Railway, about thirty-five miles from Raleigh and twenty-nine miles from Fayetteville.

This gravel has very high cementing qualities and was first used in street work at Wilmington, N. C., in the early part of 1910. Since that time the city of Wilmington has laid a great many thousand square yards of pavement with this gravel each year, and the maintenance on any of its streets has been practically nothing.

Previous to the cement clay gravel being used on Haymount Hill, the street was a constant expense owing to the heavy grades and the character of the foundation, which has a great many boiling springs oozing out. Before the cement clay gravel was placed upon it these were taken care of by means of 6 inch terra cotta underdrain. The people of Fayetteville now point to Haymount street with pride.

The city of Raleigh has also built streets of this material which have successfully withstood the heavy traffic of a freight depot, ice factory and coal yard; and during the two years these streets have been laid they have shown no signs of raveling or washing, nor has any money been spent on their maintenance.

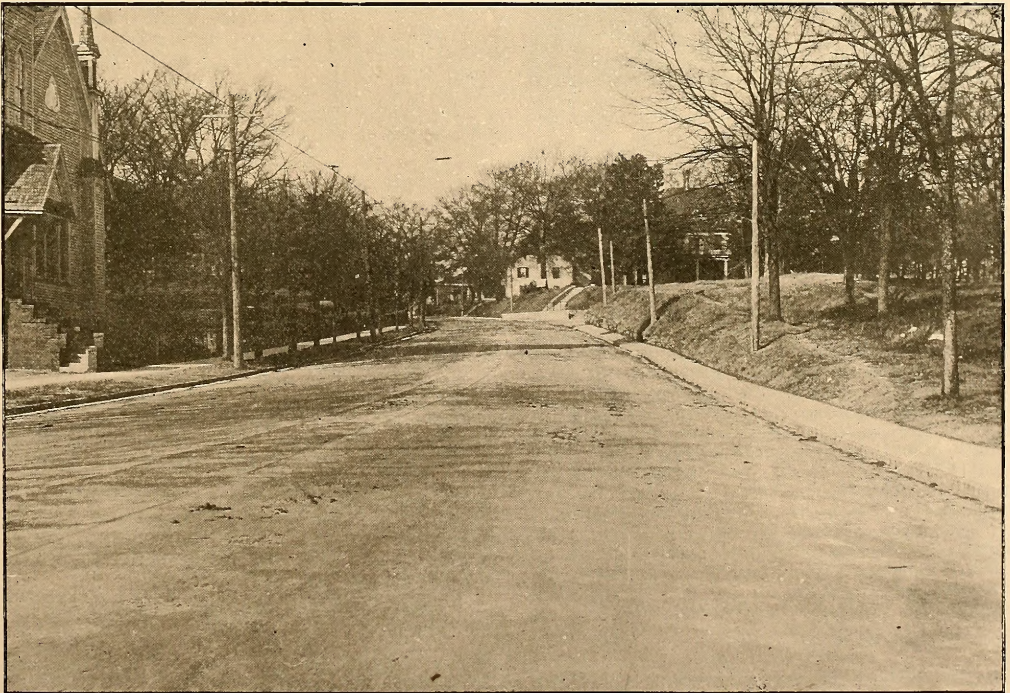
Cement clay gravel in the past few years has become very popular, owing to its low cost and its superior qualities over stone roads. It is also a favorite in the low cost of maintenance. Perhaps the greatest advantage peculiar to cement clay gravel secured in the locality of Lillington comes from the presence of the binder, which possesses the power of quickly reconsolidating the material under traffic, even after the first bond is broken, thus reducing maintenance to a comparatively simple and inexpensive matter.

An excellent indicator of the quality of the binder, though merely an inspection test, is an examination of the material in the pit. It is found to stand with a vertical face, requiring a pick to dislodge it, and larger masses occur in which the smaller pieces are cemented together as in a conglomerate.

The stone itself possesses like characteristics to those required of broken stone; that is, it is hard, tough and durable and the fine material which is abraded has the power of cementing individual stones together. The hardness is to take the wear, the toughness to resist impact and the cementations quality of the abraded material binds the road together.

However, in respect to the hardness and toughness gravel does not need these qualities to the same degree of broken stone since it is chiefly employed under conditions of average traffic.

Whether it is because gravel is cheaper than stone, or that it is considered that investigation is not war-



A view of Haymount Street Fayetteville, N. C., built of cement clay gravel

ranted, or because gravel is used in a careless and unintelligent manner the tests which are applied to broken stone are very seldom required of gravel. This neglect is an injustice to gravel itself, which is really entitled to the same careful selection as road stone. These tests should be applied not only as a means of classification to the engineer, but that they would promote the realization of the fact that all gravel is not suitable for road building.

Quoting from Chas. Morrison, Ass. Soc. C. E., an eminent authority on the subject, who says:

"It should not be assumed that because gravel is found locally, it therefore possesses qualities which fit it for a road material; nor should it be concluded that because it is cheap, much of it self-binding, easy to patch and repair in a road surface, it will in consequence give good results with less than first-class treatment. From one standpoint it is unfortunate that gravel, particularly the self-binding sort will do as much as it does, for it frequently leads some road build-

THE COURSE IN HIGHWAY ENGINEERING AT UNIVERSITY OF NORTH CAROLINA.

By T. F. Hickerson,

Assoc. Professor of Civil Engineering.

The course in highway engineering given at the University of North Carolina aims to equip the student to deal intelligently with all the problems of location, construction, and maintenance of country roads and city pavements. Both theoretical and practical training is given three hours per week during the whole scholastic year, with special emphasis laid on the principles of road building.

The class-room work consists of lectures on the history of roads and pavements, preliminary investigations, location of roads, surveying and mapping, economical design of roads, drainage, culverts, bridges, foundations, road building machinery, construction and maintenance of earth, sand-clay, "topsoil," gravel, macadam, bituminous and concrete roads; bituminous materials, dust prevention, bituminous surfaces, construction and maintenance of sheet asphalt, bitulithic, wood-block, stone-block, brick, concrete, and miscellaneous pavements; sidewalks and road administration and legislation in the United States and Europe.

The field work consists of practice in laying out grades and curves and setting slope stakes. A survey for a road about one mile in length is made. The reconnaissance is followed by a preliminary survey and the final location, and the work is conducted according to the methods of modern practice in laying out roads. A map is made showing profile, plan, and cross sections computations for the volume of earthwork and finally a report of the whole survey giving estimate of cost are required.

The laboratory work consists of an examination of road surfacing materials, and also the making of models and experimental sections of pavements along the streets of the town.

There is also included in the course at least one trip of inspection of roads and pavements in various towns and counties of the state.

GENERAL ASSEMBLY OF 1915.

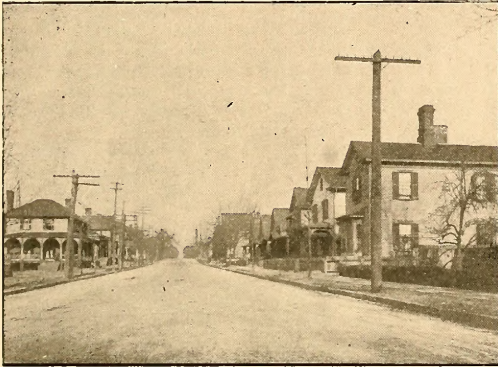
For what particular phase of legislation will the general assembly of 1915 go down in history as having accomplished? What better record could it make than to take up as an administration measure the road problem of North Carolina and work out impartially such legislation as will be for the best interests of the public roads of the state as a whole?

The demand for good roads, the fact that every citizen of North Carolina is affected by the roads and because a large proportion of the citizens are interested in obtaining good roads, would seem to point to the present as a most opportune time for a general assembly to so conduct itself as to go down in history as the "Good Roads Legislature of North Carolina."

If the good roads advocates will take it up with the men who wish to be members of the general assembly of 1915 and get them to commit themselves one way or the other on the road problem, it will not be hard to obtain the desired legislation.

Is the man who is opposed to good roads a desirable one to send to the general assembly of North Carolina?

Work has begun on the Greenville-Honoraville road in Butler county, Ala. The road when completed, will be about 13 miles long. Butler county now has 50 miles of first class roads.



South McDowell Street in the city of Raleigh paved with cement clay gravel

ers to believe that all gravels may be expected to render the same service and this too, in spite of location, drainage, grades, etc., etc., which are fundamental in the construction of all roads. Experience clearly indicates that the right sort of gravel properly laid, yields a roadway that far exceeds the best of broken stone. The conditions and the character of traffic to which this applies are found on thoroughfares other than those where teaming is heavy and excessive. As an illustration of what has been accomplished let us refer to the facts presented in a paper before the Second International Road Congress at Brussels by Mr. Rabbin. Speaking of roads under his supervision constructed for the Metropolitan Park System of Boston, he states that previous to the introduction of the automobile these roads had been constructed of macadam but with its advent it was clearly demonstrated that a surfacing other than the hard trap rock was needed. Gravel was tried with the result that the roads much more effectively withstood the heavy horse and automobile traffic, besides reducing materially the cost of labor and repairs. In this instance, and the point should be emphasized, where the best of macadam pavement had failed, the best gravel surfacing was found equal to the task."

Pinellas county, Fla., is experimenting with brick roads. One and a quarter miles of brick road is being built.

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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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CONVENTION OF THE NORTH CAROLINA GOOD ROADS ASSOCIATION.

It has been decided by the executive committee to hold the annual meeting of the North Carolina Good Roads Association at Durham, July 8th and 9th, and it is hoped that this will be the largest and most successful convention yet held by the association. Delegates will be appointed to represent all of the counties and towns of the state, and those appointing these delegates are the mayors of cities and towns, presidents of chambers of commerce and boards of trade, chairman of boards of county commissioners and road commissions. There is also a general invitation extended to anyone interested in the promotion of the good roads cause to attend and take part in the proceedings of the convention.

Few matters of public interest have excited more general concern in recent years than this vital one of road building, which affects every single citizen of the state. Whether he live in the rough, rugged mountains of the west or in the sand dunes of the east, each one has his produce to get to market or to a railroad station, and has to consider the question of transporting this produce. The condition of the road determines largely whether our own people will get a large profit, a medium profit, or no profit at all for their farm products. The condition of our roads determines whether our lands will show up well to those who may come seeking fields for investment. The condition of our through highways determines in great measure whether or not we shall have a large tourist trade. Rocky roads, steep grades, interspersed with mud holes, will destroy the effects of the most beautiful scenery upon the mind of the traveller. Sticky red mud a foot or more deep, with steep grades, will go far toward eating up the profits of even a prosperous farm, and are usually accompanied by tenant farming with the resultant land devastation.

We are now making a strenuous effort to overcome these conditions by raising money through special tax and bond issues; but our people have not yet come to the point of seeing the absolute necessity of spending this money under the direction of trained, competent and experienced men. They have not yet realized that it is impractical for the little township, with its small bond issue, or the county, with its petty politics dabbling with road funds, to get the best results with their road money. It is usually expended and the roads located by local officials without the advice and assistance of an experienced engineer, who is not in any way connected with the county administration.

With the inauguration of a State Highway Commission, it is believed by those who have studied the question closely not only from the standpoint of what is good for North Carolina but what has resulted best in other states, that much good will result and millions of dollars saved to the counties from their expenditures and from the elimination of bad roads.

It is the purpose of this convention to seek to thresh out a means by which these results can be obtained, and it is hoped that all good citizens will not only attend the convention, but will help bring to the attention of their prospective legislators the necessity for some state action in connection with the administration of our road affairs.

* * *

ROAD WORK IN NORTH CAROLINA DURING 1912.

The North Carolina Geological Survey, in co-operation with the U. S. Office of Public Roads, collects data in regard to road work and now has in press a report on the highway work in the state during 1912. The following will be of interest as a summary of the results of these data for 1912:

Expenditures.

| | |
|--|-------------|
| Total amount of special tax (including poll, etc.) for road work during 1912 | \$1,158,442 |
| Amount paid for interest and sinking fund on bond issues | 74,777 |
| Amount from special tax used in road construction and maintenance | \$1,083,665 |
| Estimated amount of bond issues used in road construction and maintenance | 800,000 |
| Valuation of free labor | 678,842 |
| Estimated value of convict labor | 250,000 |
| Total | \$2,812,507 |

Results.

| | |
|---|-------------|
| 71¾-miles of macadam at an average of \$3-150 per mile | \$ 226,012 |
| 742½-miles of sand-clay at an average cost of \$837.50 per mile | 621,844 |
| 250-miles of gravel road at an average cost of \$984 per mile | 246,000 |
| 21¼-miles of specially surfaced road | 60,000 |
| Total | \$1,153,856 |

This leaves approximately \$1,658,651 spent in maintaining the dirt roads.

From the condition of the majority of the dirt roads of North Carolina it can readily be seen that the great proportion of this million and a half dollars is spent

to little or no advantage, and is practically thrown away. This is principally due to the present haphazard and unbusinesslike methods of spending this money. With, however, the establishment of a state highway commission with competent road engineers to furnish to the counties; the placing of the county road work on a systematic basis; and the establishment of a system of maintenance by county or townships or road districts, this large sum of money will be used to advantage and every citizen of the state will feel satisfied with the conduct of road affairs.

* * *

ORGANIZATION NOTES.

Alamance County.

It is very probable that the Burlington Automobile Club and Chamber of Commerce will join us in our movement for the road legislation and road improvement.

Mr. W. W. Brown, Mr. W. S. Crawford, Mr. J. M. Cook and Mr. O. F. Crowson, Secretary of the Burlington Chamber of Commerce, are among those interested.

New Hanover County.

The New Hanover County Good Roads Association was organized on April 7, 1914, and the following officers were elected:

W. D. MacMillan, Jr., President.

W. A. French, Vice-President.

H. de W. Rapalje, Secretary and Treasurer.

Walter Sprunt, A. B. Skelding, Geo. B. Elliott, Directors.

A very enthusiastic meeting was held in the Wilmington Chamber of Commerce rooms and a great many influential citizens were present.

The immediate work of the organization will be in connection with the roads leading out of Wilmington through Brunswick and Pender counties, and especially the roads to Goldsboro, Lumberton and Southport, three very important roads in the eastern section of the state.

It is hoped that through the combined efforts of the state and local organization these counties can be awakened to the realization of the fact that good roads can be had and kept at little expense, if properly constructed and maintained.

Robeson County.

It is hoped that the people of Robeson will organize for the betterment of their roads.

Mr. Brown was in Lumberton recently and talked with a great many of the county's representative men and found them to be in sympathy with the work of the North Carolina Good Roads Association.

Robeson county has been unfortunate in having had her road laws changed so often to suit the different political factions which exist in the county.

Warren County.

Surveys for the roads in Warrenton township, Warren county, were begun during March.

It will not be long before actual construction will be well under way.

The commissioners are anxious to get as much done as possible during the coming summer.

* * *

ENGINEERING NOTES.

Alamance County.

A survey for road between Mebane and Haw River was made by Mr. D. Tucker Brown about the middle of March.

This piece of road is a link in the Central Highway, and it is hoped that Mr. W. S. Crawford and several others who are intensely interested, will succeed in having the county commissioners furnish the money for its construction.

New Road Organization in South Carolina.

At a meeting of county supervisors and road commissioners held at Columbia, last month, a new road organization was formed. It is the South Carolina Road Builders' Association. Eight counties were represented at the initial meeting and the association expects to interest every one of the 300 road officials of the state in the organization. Its object is to disseminate information concerning road building and maintenance.

The association plans to hold semi-annual meetings in Columbia and the next meeting will be held in October.

Hon. E. J. Watson, commissioner of agriculture, was elected president of the association. Mr. P. M. Pitts, supervisor of Sumter county, was elected vice president and Mr. W. C. Thomas, clerk of the road commissioners of Richland county, was elected secretary.

Members of the executive committee are:

T. J. McBride, Florence; T. J. Cunningham, Chester; C. E. Corley, Lexington; Andrew Patterson, Jr., Richland; and J. B. McCombs, Greenville. E. J. Watson, W. C. Thomas and four county supervisors to be named by the president were appointed as members of a committee to prepare the by-laws.

Following were among those present at the meeting: Andrew Patterson, Jr., supervisor of Richland county; C. E. Corley, supervisor of Lexington county; T. J. Cunningham, supervisor, and W. C. Brown, one of the county commissioners, Chester county; John Slaubes, supervisor, Aiken county; T. J. Bolin, supervisor Orangeburg county; D. R. Coleman, supervisor Fairfield county; T. M. McBride, supervisor, C. W. DuBose, John G. Woodbury, A. W. Rogers, county commissioners, Florence county; P. M. Pitts, supervisor Sumter county.

Following report by the committee on organization was adopted:

1. That the supervisors and commissioners of South Carolina organize themselves into a permanent body to be known as the "South Carolina Road Builders' association."

2. That the officers shall be a president, vice president, secretary and treasurer, and executive committee composed of five to seven.

3. That the association meet twice a year, one meeting to be held during the legislature. The other to be named by the president.

4. That Col. E. J. Watson be elected president."

A contract has been let for the building of the Fort Worth-Haslett road, out of Fort Worth, Tex. The road will be of gravel and crushed stone and surfaced with asphalt. The stretch of road contracted for is 4½ miles long and will cost \$17,994.

Mr. J. W. Best, superintendent of the road construction work being done in the southern part of Duplin county, North Carolina, while in Warsaw recently, said this work is progressing rapidly. About a dozen miles of sand-clay road has been built from the proceeds of the \$30,000 bond issue voted by the citizens of Wallace sometime ago, and about 50 miles of these roads will be completed within two years.

OFFICERS

Wm. F. Cocke, President
Richmond, Va.

C. B. Scott, Jr., V-Pres.
Waynesboro, Va.

F. D. Henley, Secretary
Richmond, Va.

C. S. Mullen, Treasurer
Petersburg, Va.

Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

EXECUTIVE COMMITTEE

Hon. G. P. Coleman
Richmond, Va.

Maj. E. H. Gibson
Culpepper, Va.

B. W. Hubbard
Forest Depot, Va.

C. B. Scott
Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary



ARTICLE III. CONSTITUTION MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

MAINTENANCE OF SAND-CLAY AND GRAVEL ROADS.

In the tidewater section where I have been working there have been many miles of sand-clay and gravel road built within the past six years. But with few exceptions the improved roads have been neglected and some have gone to pieces for want of a little care. The time has arrived when there must be some provision made for the keeping up of our roads, or the money which has been spent will have been thrown away.

As I am anxious to see our roads kept up I offer a few suggestions as to the best method of maintaining the sand-clay and gravel roads which have been built under state supervision. I agree fully with what was said at the Road Builders Association in Richmond some time since, that the maintenance of our roads should begin the day the road is finished. In my opinion the best implement to keep up a new road is the road drag (or split log drag); if this is put on the road at the proper time, which is just after a rain when the earth is beginning to dry and when it will pack in the ruts or wheel tracks, the sand-clay and gravel roads can be kept in good order at a very small expense. But after the roads have been neglected and mud-holes have formed it will require scarifying or plowing up in order to get a surface that will bond together.

If the sand which has washed off the road into the ditches is pulled up on the road before the hard surface is broken (as is often done), it will not bond and will be carried back to the ditch with the first rain. I therefore recommend where a sand-clay road is worn in holes and the ditches have filled with sand to have the sand thrown outside of the road, either with the machine or by hand. Then scarify the sand-clay surface and try if possible to break the bottom of the holes that have been formed, in order that the earth or gravel with which they are filled will bond. If you cannot break the bottom of the holes with a scarifier, it will pay to have it done by hand. Where the road has been badly worn and cannot be broken with a scarifier it should be broken up with a rooter plow, thoroughly disked, then graded with a machine to the proper crown and harrowed down with a straight tooth harrow until you get the surface pulverized and smooth. I have read where dynamite has been used to break the bottom of holes in sand-clay and gravel roads in order to let the water through the hard-pan. I have not used dynamite for that purpose but believe it could be used to great advantage. It is not practical, in this section, to build

new roads with a tractor; but I think that every county that expects to keep up its roads that have been built should have a traction engine for that purpose. The first cost is greater than horses or mules, but the work can be done much cheaper, especially in hot weather, as there is no stopping in the shade to rest, and when the engine is not at work there are no feed bills to be paid.

As the keeping up of our roads is of more importance than the building they should be under the care of experienced men; as I have seen some of our best roads ruined by men without experience or training of any kind in road work.

Z. G. DURFEE,

Superintendent Road Construction Virginia State Highway Commission.

* * *

HIGHWAY CONSTRUCTION IN CASTLEWOOD DISTRICT, RUSSELL COUNTY, VIRGINIA.

Russell county is completing a system of roads that have been built under two county bond issues, one issued in 1907 for \$150,000.00 and another issued in 1911 for \$275,000.00.

With this money there has been constructed about 75 miles of fine lime stone macadam roads, all of the macadam has not been completed but it is expected to be completed during this year.

During the summer of 1913 Castlewood Magisterial District became very anxious to build several roads connecting with the roads that had been built under the county issue. An election was called for a bond issue of \$150,000.00, and this election was carried by a large majority.

Under this bond issue it is proposed to improve about 29 miles of road. Of this amount about 19 miles will be limestone macadam and about 10 miles graded only.

During the winter months we have had a small party in the field making surveys for these roads, but owing to the severe weather during this time all of the surveys and estimates have not been completed.

One of the most important roads to be improved under this bond issue is from Castlewood, on the Clinch Valley Division of the N. & W. Ry to Dante a distance of about 7.6 miles. Dante is a mining town of about 5,000 population located on the C. C. & O. Railway. A great deal of the produce to supply these miners has to be hauled from that part of Russell county lying beyond Castlewood station. This of course makes the

road of great importance to both Russell county and Dante.

In making a location for this road we tried as far as possible to use the present road provided the grade where not too steep, as this piece of road was in an old and long-inhabited section of the county and all of the improved property was located on the present road, but in several places we had to make changes as the present grade was too steep to allow us to consider them. Castlewood station is on the Clinch river and to reach Dante a ridge had to be crossed, the lowest gap in the mountain is about 450 feet above the river at Castlewood. The present road has grades as steep as 15% in crossing this ridge which of course were entirely too steep to be considered in building an improved road.

After running several trial lines we finally located a line over this ridge with a maximum grade of 7% and with only a very small increase in distance. After getting over this ridge we reach Lick creek. At this point Lick creek is about 130 feet above Clinch river at Castlewood Station. From this point to Dante we follow Lick creek. The C. C. & O. Ry. also follows along this stream from this point to Dante. The present road crosses the railroad tracks five times on grade before reaching Dante; it also crosses Lick creek five times. By making several small changes in the location of this road we were able to eliminate three grade crossings of the railroad tracks and two crossings of the creek, without any material increase in length of road and a saving in cost of construction not taking into consideration the increase in the safety to the travelling public by eliminating the grade crossings.

After finally deciding on the above location we ran levels over same and owing to the ruggedness of the country we were compelled to take cross-sections each 100 feet in order to make a close estimate. The estimated quantities for grading and drainage were as follows: Excavation unclassified 48267 cubic yards, 828 lin. feet of 12" pipe, 288 lin. feet of 15" pipe, 100 lin. feet of 18" pipe, 160 lin. feet of 24" pipe, 102 cubic yards of cement rubble masonry, 26 cubic yards of 1:2:4 concrete, and 8360 lbs. of reinforcing steel. This does not include 2-bridges 50 feet over Lick creek and one 37 foot bridge over Gravel Run. This road will be surfaced with lime stone at a later date; if possible it will be done during the latter part of this season.

The estimated cost for grading and drainage, exclusive of the three bridges mentioned was \$26,341.30.

Bids on this were opened in Lebanon, Va., March 16, 1914. The highest bid received based on the above quantities was \$27,508.64 and the lowest was \$25,779.41. The contract was let to J. C. Lipsecomb & Co., they being the lowest bidders. The work is to be started on or before April 15, 1914, and to be completed on or before Jan. 15, 1915.

Another piece of work to be done under this bond issue is from St. Paul in a southwardly direction for about 2.9 miles to connect with an important road built under the county bond issue running east and west; this road will enable a large per cent of the people of the southern and western part of Russell county to reach St. Paul over an improved road. St. Paul is located on the Clinch river at the inter-section of the Clinch Valley Division of the N. & W. Ry. and the C. C. & O. Ry.

In making the location for this road we were able to use about two miles of the present road which is on a good grade about 0.9 of a mile we had to make a new location as the grades on this part of the present road were too steep to be considered in building an improved road. The maximum grade on this road is

not to exceed 7%. The estimates for this road were made in the same way as for the above road from Castlewood to Dante. The estimated quantities on this road for grading and drainage were as follows:

Excavation unclassified 12258 cu. yds. 400 lin. ft. of 12" pipe, 140 lin. ft. of 15" pipe and 80 lin. ft. of 18" pipe.

The estimated cost based on the above quantities was \$7,856.03. Bids for this work were received in Lebanon, Va., March 16, 1914, and the contract let to the Bluestone Construction Corporation, they being the lowest bidders. Their price for doing the work based on the above quantities was \$7,492.18. The highest bid received was \$7,891.93. This work is to be started on or before April 15, 1914 and completed on or before January 15, 1915.

We also expect to macadamize this road with lime stone rock as soon as the grading is done.

We expect to start the work on the other roads under this bond issue in the near future either by contract or force account, and hope to complete all of the work during the year 1915.

Bristol, Va.

A. H. PETTIGREW,

Asst. Engineer Virginia State Highway Commission.

West Virginia.

Concerning the work the University of West Virginia is doing for the cause of good roads in the state. Mr. A. Dennis Williams, state highway engineer, recently made this statement:

The value of an institution lies in the work it does for the people of the state or community. Especially is this true of a state university. Its greatest mission is to serve best the people who support it. This can be done in helping to solve the problems that affect the most people. Nothing in this state offers a greater opportunity for good service than the improvement of the highways. The College of Engineering of the university has installed a laboratory for testing road materials and is planning to prepare and guide skilled and trained engineers to assist in the location and construction of the roads.

The road school which all county engineers of the state are requested to attend and to which any other person is admitted without registration fee, offers a solution for a number of the state's different road problems. The first session of the school held this semester, February 10 to 20 inclusive with a registration of 146, was in every respect a success and marked a new page in the history of the state.

Besides this work the university through the state road bureau, the extension division of the College of Agriculture, and the state department of agriculture, are carrying on a campaign of education extension work in road building and maintenance. This class of work is yet in its infancy, but its usefulness has been well demonstrated in the limited time the work has been in progress.

By this method, prior to April 1, thirty-five meetings have been held in twenty-four counties of the state, with a combined attendance of 3,170 persons who received instruction in road building and maintenance; thirty conferences with county officials in thirty different counties have been held, and by correspondence, every county and district road official in the state has been reached.

This extension work will be carried into every county of the state where the district and rural schools will be given an opportunity to assist and asked to join hands with the university, the road bureau, and the agricultural department in helping lift West Virginia out of the mud.

GOOD ROADS NOTES IN BRIEF

Road district No. 2 of Denton county, Tex., has voted \$22,500 for road construction.

Clay road district of Hancock county, W. Va., voted a bond issue of \$40,000 on May 23 for good roads.

Smithfield township, Johnston county, N. C., has voted \$150,000 of bonds for roads.

The town of Ennis, Tex., votes this month on a \$35,000 bond issue for streets.

The city of Baltimore, Md., has contracted for street paving amounting to \$72,079.70.

Hernando county, Fla., has contracted for 10 miles of vitrified brick roads at a total cost of \$110,000.

Tarrant county, Tex., has contracted for 4½ miles of macadam at a total cost of \$17,994.

Houston, Tex., is paving some of its streets with vertical fibre bricks. \$8,100 is being expended on this sort of pavement.

Little Rock, Ark., has contracted for concrete paving to the amount of \$15,000.

Mt. Airy township, Surry county, N. C., has awarded contracts for 25 miles of roads.

Bexar county, Texas, has contracted for the construction of 60 miles of roads at a cost of \$183,172.

St. Louis, Mo., has contracted for street paving amounting to \$123,731.

Alexandria, La., has been asking for bids of 6,000 square yards of bitulithic.

Birmingham, Ala., will spend \$15,000 in street improvement.

Road district No. 1 of Milam county, Tex., will build 40 miles of roads radiating from the town of Cameron. Decatur, Ala., has arranged to spend \$100,000 in street paving.

The city council of Gadsden, Ala., will oil five miles of streets as a means of dust prevention.

Hendersonville, N. C., will pave six blocks at an estimated cost of \$15,000.

Lexington, Ky., will receive bids until the 15th of this month for street paving amounting to \$242,000.

The town of Mt. Airy, N. C., will pave a mile of street at a cost of \$22,500.

San Antonio, Tex., is asking for bids on 200,000 square yards of pavement.

Wake county, N. C., is to construct a 108-foot bridge across the Neuse river.

St. Louis, Mo., will vote on November 6 on a bond issue of \$2,750,000 for the Reber approach bridge.

Bexar county, Tex., has contracted for the construction of a number of steel culverts in precincts Nos. 1, 2, 3 and 4 at a total cost of about \$39,000.

Sussex county, Va., will build two steel bridges near Wakefield.

It is announced that County Judge Voris Gregory, County Attorney F. B. Martin and the eight magistrates comprising the Fiscal court of Graves county, Ky., will start a campaign at an early date for good roads throughout the county.

Holmes county, Florida, is experiencing great good roads enthusiasm. There is strong sentiment for a bond issue to build sand clay roads and a road district, comprising three townships, has been formed.

Improvement of the National Pike, west of Columbus, next year and the completion of the entire route from West Virginia to Indiana within two years is the program of Governor Cox and State Highway Commissioner Marker, of Ohio.



Installing 200 Feet American Ingot Iron Culvert at Weldon, N. C., on the Atlantic Coast Line R'y

For Permanent Improvements

Leading railroads, development companies and the United States Government are safeguarding their rights of way, their property investments and their public roads by using

American Ingot Iron Armco Culverts

Engineers and road builders know that pure iron resists rust. American Ingot Iron Culverts being 99.84 per cent pure iron, make them the most durable, the most economical for permanent improvements.

Light in weight—easily installed, cheapest in the long run. Look for trade mark on every section.

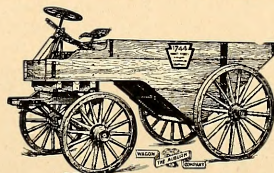


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Greensboro, N. C.
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SAVE HAND LABOR



"NEW AUBURN STONE SPREADER"

Spreads Crushed Rock, Gravel, Etc., to Any Desired Thickness.
Flow of Stone Regulated from Driver's Seat.

MARTINSBURG, W. Va., Nov. 11, 1915.

Auburn Wagon Company, Martinsburg, W. Va.

GENTLEMEN: I am much pleased and gratified with the two Auburn Spreaders that you furnished this Company recently, and I am willing to confess that we are saving at least \$1.00 per day on each wagon by the reduction in the cost of spreading stone on our turnpikes.

I expect to increase this saving still more shortly, so that the investment which at first we thought was rather expensive is now the most profitable money that we have ever spent for equipment in our work.

There is no reason why this wagon should not be used by all turnpikes to good advantage.

You are privileged to refer any one to us for a further recommendation. The levers which you attached at my suggestion, are just the thing wanted.

These wagons are well constructed and substantially built, and I have no doubt will last us almost a lifetime. Truly yours,

MARTINSBURG & WINCHESTER TURNPIKE CO.
(Signed) JAMES H. FULK.

Dump
Wagons
and
Carts



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Wagons
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Gears

Auburn Wagon Co.,

891 Race St.,
Martinsburg, W. Va.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

A model piece of road work has just been completed from the Montgomery county line to Vidalia, Ga. It is said to be as near perfect as can be constructed of a sand and clay mixture. The distance has been shortened between Vidalia and Mt. Vernon from a three-hour trip to a seventeen-minute trip by the elimination of a continuous sandbed through which the road formerly ran.

* * *

The Barber Asphalt Company has issued a very beautiful little booklet entitled "Good Pavements and Roads in the South." The book is full of photographs showing fine streets and roads in the south, treated with Trinidad Lake sheet asphalt. Some of these streets are 30 years old.

* * *

One hundred and fifty citizens of Donley county, Texas, turned out en masse on May 6 and worked a portion of the Colorado-to-the-Gulf Highway. The day had been set aside as "Good Roads Day." The good roads committee of the Clarendon Chamber of Commerce went about the work in a systematic manner, dividing the road into sections. The overseers had already inspected the road and knew just where the work was needed most of all and no delay was occasioned in getting to it and getting the men to work. The road was covered from county line to county line, and is today in as good shape as any portion of the highway which lies in that section of the state.

* * *

The grand jury of Fulton county, Georgia, the county in which Atlanta is situated, has recommended that no more new road work be undertaken in that county until the roads already begun are finished. It is understood that the county commissioners will do as the grand jury suggested. One commissioner, Mr. S. B. Turman, recently endorsed the grand jury's ac-

tion. "While the grand jury recommendations are not binding on the county commission," declared Mr. Turman, "the board always tries to carry out the wishes of the investigating body. I heartily endorse what the committee urges as to finishing roads and building concrete bridges. The commission is already pledged to the latter schedule and, I think, will see the wisdom in the former."

* * *

The Chattanooga Times notes that the Chattanooga-Rabun Gap highway has been made the subject of a request for federal aid by Congressman Thomas M. Bell, of Georgia, who has introduced a bill in congress for an appropriation of \$250,000 to aid the various counties in the construction of a first-class highway. The reason assigned for the request for government

W. S. FALLIS, WILSON, N. C.

Civil and Highway Engineer

Highway, Bridge and Sewer Construction. Street Paving and Water Works

WALTER WILSON CROSBY

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CONSULTING ENGINEER

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THE GALION IRON WORKS & MANUFACTURING COMPANY



Galion Premier Road Machine
WRITE US FOR COMPLETE CATALOG

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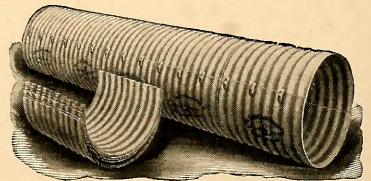
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AMERICAN SHEET AND TIN PLATE COMPANY, Frick Building, Pittsburgh, Pa.



assistance is that such a road will connect Chickamauga National Park and the National Appalachian Forest Preserve. The road which would be about 125 miles in length would start at Rabun Gap, near the point where the states of North Carolina, South Carolina and Georgia meet and would pass through the towns of Union, Fannin, Gilmer, Pickens, Murray, Whitefield and Catoosa. This proposed national highway would probably be routed within sixteen miles of Ducktown, giving a valuable outlet to the copper fields. It could also be connected with the Chattanooga-Atlanta highway at or near Dalton.

* * *

The United States Asphalt Refining Company, a subsidiary branch of the Interocean Oil Company, has issued a very beautiful booklet telling of the merits of Aztec Asphalt. The Interocean Oil Company operates great oil wells in the state of Vera Cruz, Mexico, and handles quantities of natural lake asphalt. This asphalt is refined to whatsoever consistency is required to meet the condition for which it is to be used by the United States Asphalt Refining Company and it is one of the very best natural lake asphalts on the market today. Another product of the company, Aztec Liquid Asphalt, for oiling roads, is also famous throughout the land. The booklet is profusely illustrated with fine cuts showing good roads and good streets built of Aztec Asphalt in all parts of the country. Another picture that is especially interesting right now is one showing one of the company's oil steamers loading in the harbor at Tampico, Mexico. A copy of the booklet may be had by writing the company at 90 West street, New York City.

CEMENT CLAY GRAVEL

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North Carolina Legislature of 1913 created low freight rates on this gravel for use on public streets and roads in North Carolina.

Information and prices F. O. B. cars your siding or laid in streets, on request.

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Asheville, N. C. "America's Beauty Spot" "Land of the Sky"

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A city of happy homes, fine churches, splendid schools. Where hospitality prevails, where cordial business and social relations make men valuable citizens: Asheville, the Ideal City in which to establish a home and do business.

Asheville, The Greatest Tourist Center in America

Has 38 miles paved streets and more than a hundred miles macadamized and sand-clay improved roads. Was first city South to organize a Good Roads Association. Illustrated booklet free.

N. BUCKNER, Secretary Board of Trade

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Hot Springs, - North Carolina

The Ideal Summer Resort. Write for Booklet

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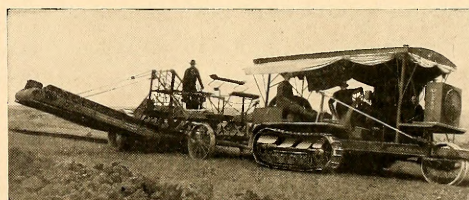
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Your Best Place for Investment

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Our specifications show why the Caterpillar can grade cheaply. The large bearing surface of the tracks distribute the weight so that the tractor does not sink in sand or mud. The tracks also give a large pulling surface—hence more power. No power is lost in slipping—a weakness of the round wheel tractor.

The Caterpillar handles easily. It turns short, even in sand. Its low center of gravity helps you finish ditches. There is no danger of tipping over. The large tracks prevent any injury to the sub-grade.

Your time is money. With the Caterpillar you can do your grading quickly. In a contest before the County Commissioners at Billings, Montana, the Caterpillar graded 350 yards of road in 1 hour, 42 minutes. Our nearest branch will furnish you many more examples. Write for folder of specifications, D F 30.

THE HOLT MANUFACTURING CO. (INCORPORATED)

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New York.

John N. Carlisle, commissioner of highways of the state of New York, and Walter E. Fisk, secretary of the New York State Automobile Association, were guests of the Rome, N. Y., Chamber of Commerce last month and spoke at an open meeting held in the Masonic temple hall. There were delegations of farmers present from the surrounding towns.

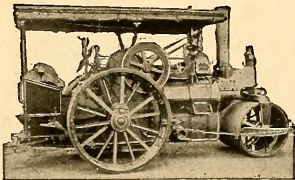
Mr. Carlisle spoke on the question of good roads. He said Massachusetts last year built fifty-three miles of good roads, and they thought they were some road builders, while New York built over 1,200 miles. This year there is to be expended in Oneida county, the county in which Rome is situated, \$1,800,000 for county roads and \$880,000 for state roads. He said that more money was appropriated for good roads in New York than for any other public enterprise in the United States at the present time. The people have gone mad over good roads, he said, and, notwithstanding the stories of graft, for which he said there may have been some foundation, the people of the state would go to the polls and vote \$100,000,000 more for good roads.

* * *

Wyatt C. Franks, auditor of the United States bureau of good roads economies, has arrived at Meridian Miss., and will make a study of good roads and gather statistics on the cost of construction, the increased value of lands adjoining the roads and other valuable information which will be used by the department for the guidance of other localities engaging in good road work.

Men are never criticized for what they do if they never do anything.

IROQUOIS ROLLERS



Tandem and
Macadam.

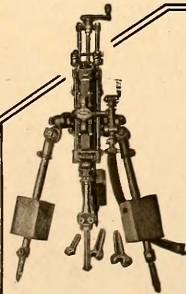
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with bronze packing sleeve; Vanadium Tugsten Iron in cylinder, chest and air-head (the most durable metal known for this work); this is the construction of

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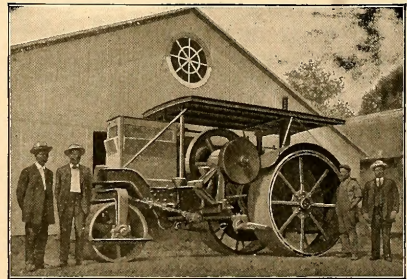
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Our new shale Pipe is unsurpassed in quality and strength. It is used exclusively by North Carolina Counties where highway improvement has long been under way. Prices on application.

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Annual capacity 2000 Car Loads



Buy the I H C Road-Roller Tractor

The I H C road-roller tractor is three machines in one; a road roller; a tractor to furnish power for grading machines, for hauling stone and other material and to move the concrete mixer as required, and a portable engine to run the stone crusher or concrete mixer.

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Florida's Needs

By L. E. BOYKIN

Engineer U. S. Office of Public Roads

The State Good Roads Association of Florida was organized for the purpose of promoting the cause of better roads in the state. I take it, therefore, that you gentlemen realize the necessity for better roads and that you recognize the fact that in order to get them a proper co-operative organization working to that end is essential.

The state of Florida needs better roads very badly. Probably no other state in the Union will find a system of improved highways a greater asset than will your state. This is true because your soil and climate make your state essentially a trucking state. Your truck and fruit products and your tourist trade constitute your two most valuable assets, and to each of these improved highways are necessary.

In the case of your truck and fruit products they must be moved from farm and orchard to shipping point for shipment to market. These products must reach the shipping point as quickly as possible after the harvest and in a fresh and unbruised condition in order that the producer may get the top of the market. Also, the producer must be able to reach the shipping point with his products at a minimum cost of hauling. To do this, it is necessary that the roads be improved so that a maximum load can be hauled in a minimum of time and be delivered in good condition.

The Tourist Trade.

As regards your tourist trade, while it is already an enormous business, yet, when we consider its possibilities, we are forced to admit that it is really in its infancy. Florida should be the nation's winter playgrounds. It is possible for you to make it so, and you will find that nothing you can do will conduce more to that accomplishment than the development of a continuous system of improved highway. The automobile and the tourist are inseparable, and the most popular tourist region is the one having splendid highways, affording unlimited opportunity for comfortable, rapid and extensive motoring. If your state were traversed by improved highways your tourist business would be immediately multiplied many times and your state enriched thereby. Not only would your state derive a direct financial benefit from its tourist trade, but it would get much good, wholesome advertisement by those who would come among you and go away to tell their friends of the great pleasure of being in your midst by reason of the facilities which you so wisely place at their disposal, and this would prove an indirect benefit of great magnitude.

If then it is desirable, and even necessary, that you have a system of improved roads, the great question is, how can you best get them. What is necessary to be done in order to procure them?

Manifestly, you cannot get them in the manner in which all of your efforts have heretofore been directed. First of all, it is necessary that you have the proper kind of organization. So big a project can only be accomplished through efficient organization, and it is important to have that organization of the right character. Is your present organization of the right character? Let's look into that question for a moment.

Faulty Administration.

For nearly a century your road affairs have been administered under the system now in vogue. This sys-

tem is one of local administration, each county having control of its own roads and dealing with them without regard to adjoining counties. Under the system no effort was made to have the roads of the several adjoining counties articulate at the boundary lines so as ultimately to form a continuous system of inter-county highways. What has been the result? As a result you have a disjointed or disconnected system of highways with here and there a few sections improved, the aggregate result being that in 1909 you had only about 9 per cent of your roads improved. This was the result of nearly 100 years' operation of your present system, and at that rate it would take more than 1,000 years to improve all of your present roads. It is evident, therefore, that your present system has not produced the desired results, and should be abandoned for some more efficient system.

On the other hand, you have the example and experience of other states to guide you. Up to about twenty years ago all of the states were operating under a system of road administration identical to that you now have. But some of the states began to realize that this system was defective, so that in 1892, New Jersey amended its system of road administration by creating a state highway department and appropriating state funds to aid in road construction. Other states followed this example, falling in line in such rapid succession that today forty-one of the forty-eight

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states have state highway departments with general advisory and supervisory powers over the roads of the state. A noteworthy fact in this connection is that only one state having adopted a state highway department has as yet repealed that action and even that state has since enacted a new law providing for such a department. It is also noteworthy that the states first to adopt the principle of state aid and a state highway department are the ones that stand at the head of the list today in the percentage of improved roads.

An Efficient System.

Here then is a system that has been found efficient by all of the states that have tried it, and it has been tried by all but seven of the states, Florida being one of the seven. Why then does not Florida try this plan which has been tried and found good and efficient? It is not an expensive nor an intricate plan, but a simple, effective, economical and inexpensive plan. The entire cost of such a department would be more than saved each year through the better results obtained from the expenditure of road funds. Such a department should furnish advice and engineering assistance to the county officials when called on, and this feature alone would save to the several counties many times over each year the cost of operating the department. It should, in fact, enable the counties to get a dollar's worth of road for every dollar expended on the roads.

Such a department might be called either a state road commission, state highway commission, or state highway department, and could consist of any number of members not exceeding five. Some states have one member, some three, and some five. I cannot say which has proven the most successful.

If there is objection to appropriating money for the maintenance of such a department from the state treasury direct, the proceeds of the automobile licenses could be applied to that purpose. Kentucky started off in that way, the proceeds of its automobile licenses being used to maintain the department, and several states apply this fund to actual road construction work. New York state derives about \$1,000,000 of road funds from this source each year.

Could Utilize Convicts.

Florida may also aid in its struggle for better highways by utilizing its state convicts on its road. In 1909 Georgia passed an act placing over 5,000 convicts at work on its roads. As a result, that state now ranks second in point of progress in road improvement, New York ranking first. By thus using the convicts of your state a valuable asset will be added to the cause of better roads for Florida.

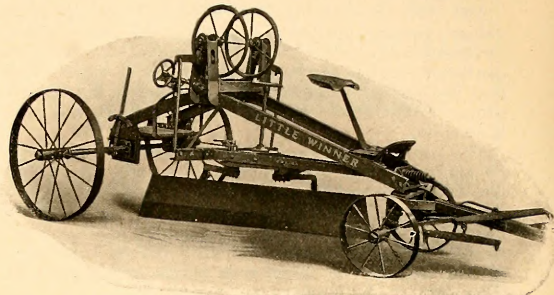
It is evident, gentlemen, that if your state is to have improved roads you must modify your system. The only modification that has been thoroughly tested and found satisfactory by other states is that of some form of state highway department to have general advisory and supervisory powers in relation to the roads of the state. This will be the ultimate solution of your road question.

If it is possible to build permanent roads by the issuance of bonds, this is the thing to do. If this cannot be done, then the next best thing is a systematic use of the split log drag.

The town that is lost in the shuffle is the one that has no good roads leading into it. The town that is not upon the map is the one that is without good roads and good streets.

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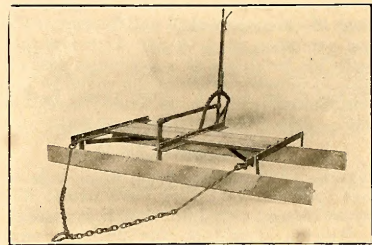


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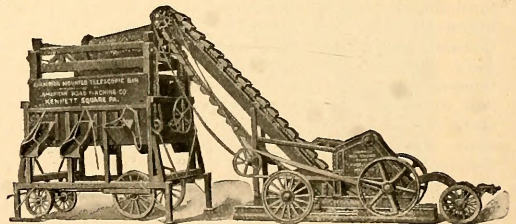


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Shall the United States Build Highways

By C. H. CLAUDY

National Highway Association

IT IS a question which is slowly but surely forcing itself upon the National Legislature. Many senators and representatives now believe that the building of a system of National Highways is of more economic importance than any other public work—more vital than the question of a large navy, more useful than any river and harbor improvement, more necessary than the Panama Canal. For Highways are built and owned by the people and are free to all the people. A few years ago road bills had short shrift in congress—at present there are nearly a hundred bills before congress dealing with road building in one form or another.

Although the "good roads" idea has been gathering force and headway for many years, its advocates are still pulling in many directions. Some road associations want State Highways with National Aid. Others want State Highways without National Aid. Still others want good roads paid for by the counties through

soon sees the advantages of connecting all parts of the states with those national roads.

There are two million miles of roads in the United States. The fifty thousand miles of highway proposed by the National Highway Association is but a fraction over two per cent. of this mileage. But improve these fifty thousand miles into good roads, and keep them good roads by proper maintenance, and fifty thousand miles more would grow almost over night, and then another fifty thousand and another and another, until our great country, with its huge territory, would be crossed and recrossed with good roads, as France is to-day.

National Highways Abroad.

France has National Highways. These are immense trunk line roads, great arteries of commerce, and from these the smaller roads are built by the provinces of France, just as the states and counties of our states will build feeders and connections to a National System of Highways.

If France—about the size of Texas—needs national highways, how much more do we, with our huge territory, require them?

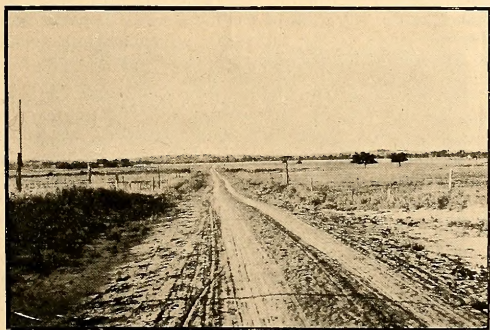
Many idealists and dreamers have proposed National Systems for this country. Usually the system has been worked out with a map, a ruler, a pencil, and sublime faith. Mountains, lakes, rivers and forests form no obstacles to such visionary road systems. The National Highways System, as shown on their map, is the product of no such dream. The highways indicated are either the best present roads from point to point, or what are, in the judgment of a trained and experienced corps of road engineers, the best possible and practicable roads from point to point.

But these engineers, who worked months on hundreds of large scale maps, and with the aid of a nationwide correspondence of more than fifteen thousand personal letters asking information and advice know this system is only tentative. It is but a suggestion. It is not intended to be anything else. There must be a beginning to everything, and little headway can be made without some such careful plan from which to start.

Links States Together.

Study the map and see where your home lies with relation to the highways. If it is on a Main, Trunk or Link Line, you will probably like the system. But if you live somewhere that this system does not touch, don't condemn the system. Remember that it is designed to connect the states with each other. It is intended to touch every large city, every state capital and to bring close together the several parts of the country. The roads are as straight as the contour of the country will permit, without an impossible expenditure of money to tunnel mountains or bridge lakes and rivers. Remember, too, that your locality would be connected with such a system by a local road in a very short time.

Notice that there are three classes of highways, Main, Trunk and Link. The Main Highways are six in number, Northern, Central, Southern, Atlantic, Mississippi and Pacific. These form the starting point and the basis of the system. Next come thirteen great trunk



A fine sand-clay road near Dodge City, Kansas. This road has been undergoing heavy traffic for one year

which they pass, without any aid. One, at least, believes firmly that the question is not only one for states, counties, cities and towns, but for the nation.

The National Highway Association believes that the beginning of a comprehensive good road system for the nation must be made by the federal government.

Such a system—as outlined on the map recently published in this magazine—consists of fifty thousand miles of national highways. It is not intended that this map should represent the entire good road system needed by the United States. It is merely a tentative suggestion of the Nation System of National Highways, from which good roads built by states, by counties, and by cities and towns, would grow and multiply.

Roads Breed Roads.

It is universal experience that one mile of good road breeds another mile. Put a state-wide, good road down anywhere in this country, and in ten years there will be dozens of good roads reaching it from all parts of the state. Put down a system of national highways, built and maintained by the national government, and the various state legislatures and county officials would

lines, feeding and crossing the main highways, and connecting the various sections of the country in more intimate relations. Finally come forty Link Highways—smaller National Highways—making a gridiron of the whole system.

Building the System.

To build such a system complete will take a man's lifetime and a huge amount of money. If the wealth of the world were ready to build this system tomorrow, it would still take many years, because there are available neither engineers nor knowledge enough to do it quickly.

When this, or a similar system of national highways is built—and built it surely will be some day—it will be by a National Highways Commission, which first locates and then builds, one or more roads at a time, learning as it builds. When this huge amount of money is spent—as spent it is bound to be—it will be gradually and through an annual appropriation.

If New York state can afford five millions a year for road building, is it unreasonable to suppose the United States Government can afford ten times as much—or fifty millions a year?

Think it over. Look at the map. Study it and see how it will affect you and your home. If you have any suggestions to make, or criticisms to offer, the National Highways Association would like to hear them.

The system as outlined is only a beginning—a suggestion. But if it appears as a beautiful dream, it is at least a practicable, engineer's dream, and a dream which—like that of de Lesseps and the canal—is bound to come true some time. The National Highways Association believes that the time when the dream begins to come true is close at hand. It is a dream which vitally affects every man, woman and child in the country—a dream which, when it does come true in its entirety, will be found of more importance to our progress as a nation, to our wealth, to our social and political life and to our other dream of absolute independence, than any one movement we, as a nation, have ever made.

Maryland's New Road Commissioners

The Maryland State Roads Commission has three new members. They were appointed last month by Governor Goldsborough. They are Thomas Parran, of Calvert, John M. Perry, of Queen Anne's and J. Frank Smith, of St. Mary's.

The board is composed of seven members, including the governor, who is a member ex-officio. All except the governor will hereafter receive pay. Heretofore there have been two unpaid members, in addition to the governor, these two members being taken from the state geological and economic survey.

Governor Goldsborough said concerning his selections:

"I selected these gentlemen because I considered them eminently qualified for the positions. Mr. Perry is the next to the largest taxpayer in Queen Anne's county and one of the most successful farmers and business men in the state. Mr. Smith I have known for many years and hold in the highest esteem. He is a man of good business judgment. And everybody knows that Tom Parran is a good business man."

The new road law under which Governor Goldsborough made the appointment required that two democrats should be selected and that appointees should not come from the Maryland Geological Survey. This act legislated out of office, Dr. Ira Remsen and Dr. William Bullock Clark, both of Baltimore and Baltimore people are not exactly pleased with the situation, judg-

ing from the remarks of the esteemed Baltimore Sun.

Being members of the state geologic survey Dr. Remsen and Dr. Clark drew no salaries and they give way to two men who draw \$2,000 each. The third vacancy was caused by the death of E. E. Goslin.

The Roads Commission is now composed of:

Governor P. L. Goldsborough, lawyer.

O. E. Weller, Baltimore county, chairman, capitalist and retired banker.

Walter B. Miller of Wicomico county, kindling wood manufacturer.

Andrew Ramsay of Alleghany county, brick manufacturer.

Thomas Parran of Calvert county, farmer and politician.

John M. Perry of Queen Anne's county, farmer.

J. Frank Smith of St. Mary's county, farmer

Good Roads Activity in Texas.

There is great good roads activity in that section adjacent to the live town of Temple, Texas, in Bell county. Road district No. 5 of Bell county, which embraces Temple, covers 20 square miles and it recently voted bonds for \$400,000 to build a system of roads. These roads are to radiate from Temple in six different directions, running to the district line and there connecting with good roads of other districts. The commissioners estimate that \$400,000 will build approximately 100 miles of road. A news dispatch from Temple contains the following information in regard to the connection this district's system will make with the roads in adjoining districts:

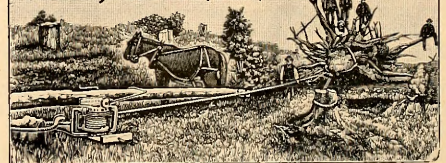
In connection with the hundred miles in the Temple district, the Holland district joins at the Little River crossing on the south. The same character of work is to be done in the Holland district, which will provide for an additional 50 miles.

Connecting at Heidenheimer on the southeast is the Rogers district, with 75 miles, and on the southwest the Belton district is just completing 30 miles.

It is anticipated that the Temple district, Holland district and the Rogers district will be entirely completed by the middle of next year, and will represent about 255 miles of permanently graveled highways in Bell county. Including the work to be done in the city of Temple by District No. 5, the expenditure by the Commissioners' Court in the four districts, Temple, Holland and Rogers, is \$1,055,000.

E. A. Kingsley, engineer, who is handling the district, was for many years in charge of the city and county work at Little Rock, Ark., and later was highway engineer for the state of Arkansas.

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SOUTHERN GOOD ROADS

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The Valley Turnpike

By HARRY FLOOD BYRD

Editor Evening Star, Winchester, Va.

Built as a part of the great stage coach route from the north to the south and to satisfy the determined demand on the part of the local counties for aid from the state of Virginia for internal improvement, the Valley Turnpike Company is one of the first examples of any state appropriating funds for highway construction.

For years previous to the actual passage of the bill, the issue was an intense one, was the subject of many

those of the territory now comprising the state of West Virginia was effected, by which two companion bills were enacted into law, obligating the general assembly of Virginia to pay three-fifths the cost of construction of a turnpike road from Staunton to Winchester to be called the "Valley Turnpike" and a turnpike road from Winchester to Parkersburg, W. Va., to the state line of Ohio, to be called the North Western Turnpike.

The preamble of the bill for construction of the Valley Pike passed by the general assembly provided "that the proposed route take the general course of a great stage line from Baltimore to the Tennessee road," which was at that time the stage road from the north to the south.

Ultimately, the extension of the road through Virginia to the Tennessee line was contemplated.

This plan, the consummation of which would have resulted in the construction of an improved highway entirely through the state of Virginia, never materialized.

The North Western Turnpike was to form an outlet from Virginia through the mountains to the west and in the bill creating each of the turnpikes, provisions were made for toll gates, the rates of toll was fixed by legislative enactment and the state washed its hands, so to speak of any future responsibility for the cost of maintenance.

The magnitude of these two undertakings can be readily appreciated, necessitating the construction of roads through almost impenetrable forests, over many rivers and mountains and requiring the highest engineering ability to secure satisfactory grades.

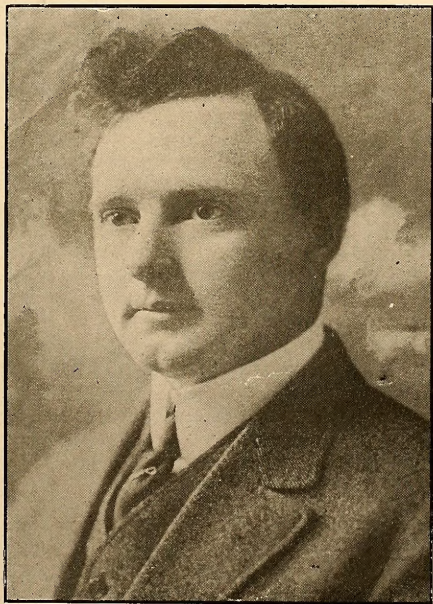
It is true that a rough road was already made for these two routes.

There had been, however no serious attempt at systematic maintenance, the maintenance being done by residents along the road who by law were required to work four days of each year on the road adjacent to their property. This unskilled, transitory and unorganized maintenance was of little real benefit.

A potent factor in the selection of the Valley of Virginia for the construction of a solid macadam turnpike was the large quantity of natural limestone available.

For this reason the Valley Turnpike was much more substantially constructed than the North Western Turnpike and to this day has retained its continuity, while the North Western Turnpike has lost its original identity by being divided into many sections.

Completed in 1838 the Valley Turnpike, ninety-two (92) miles in length, cost \$465,000 for construction,



MR. HARRY FLOOD BYRD
Editor The Evening Star, Winchester, Va.

heated debates in the general assembly and resulted in bitter feeling between the legislators of Eastern Virginia, who desired state aid in river and canal improvement and the legislators of Western Virginia, who desired state aid for road construction.

Finally after much legislative bickering, a coalition between the legislators of the Valley of Virginia and

three-fifths of which was paid by the state and two-fifth by subscriptions by private individuals.

The road was substantially built, the foundation being composed of large boulders of limestone covered with finer stone of the same kind, and was well graded and bridged.

The supervision of construction was by General Crozet, a distinguished French engineer, who had served under Napoleon Bonaparte and had come to America after the battle of Waterloo.

The Valley Pike to-day stands as a monument to his great engineering ability.

Providing a good road for quick manoeuvres and expeditious movement of troops, the Valley Turnpike during the civil war was the scene of many attacks, marches and raids. The scene of bloody conflicts, valorious deeds and numberless depredations on property.

The Valley of Virginia was called the grainary of the south. Sheridan was ordered to go forth and lay waste this rich territory. He certainly carried out his instructions.

Winchester the terminal point on the north changed hands seventy-seven times during the war.

Along the pike at New Market one of the most gallant actions of the war took place. The Virginia Military Institute cadets, fresh from school and mere boys, yet filled with unconquerable courage, fought the experienced soldiers of the enemy, like seasoned veterans and although at terrific loss of life, were victorious.

Many shafts now mark scenes and battles of historic interest along the pike.

In May 1861 a most remarkable procession wended

its way, slowly and arduously along the pike. Stonewall Jackson moved five locomotives and thirty-six cars loaded with coal for a distance of twenty miles, appliances being used to protect the roadbed from flanges of the engines and eighteen horses were required to haul each engine.

Since its inception the Valley Pike has been operated more to advance the material welfare and prosperity of the people of the Valley of Virginia, than for profit. In the history of the Company only one dividend of one (1) per cent has been paid.

On my election to the presidency of the company, about six years ago, the broken stone method had given entire satisfaction.

The roadbed was the accumulation of nearly seventy years of limestone dust pulverized by the steel tired traffic, before the advent of motor traffic, cemented into the foundation of the road.

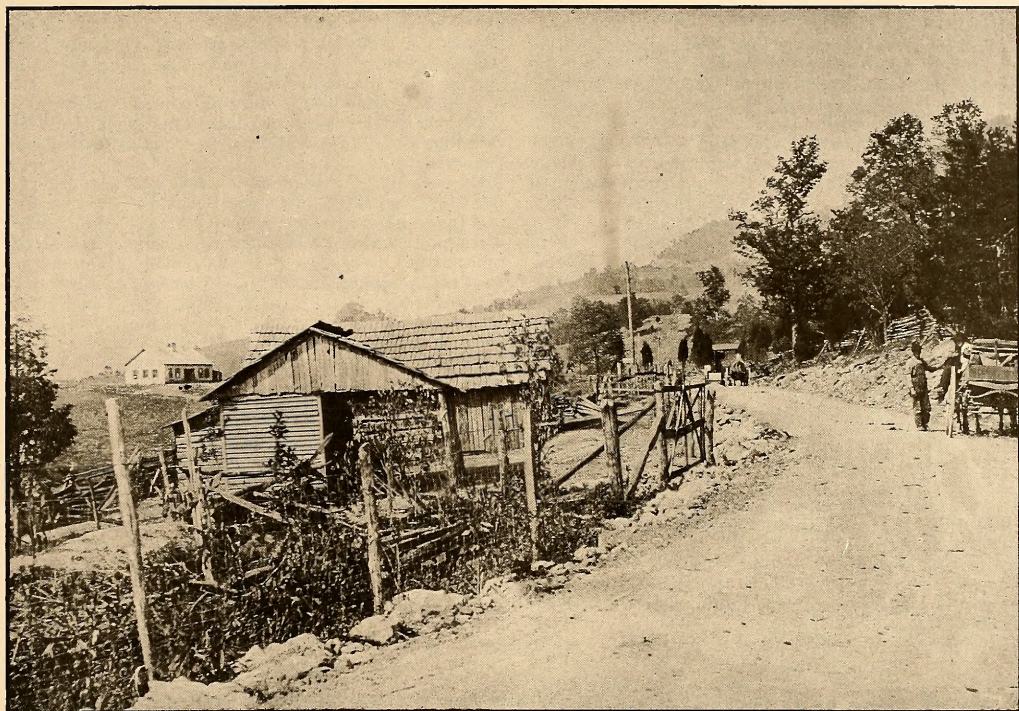
My first important task was grading the road, opening the ditches and preventing the damage by water from which the road was suffering severely.

Prior to that time, little if any attention had been paid to the crowning of the road and opening ditches, the system of drainage being the construction of ridges across the road on hills and in that way endeavoring to prevent water running down the centre of the hills.

These "Thank-you-mams" as they are sometimes called, due to the fact that they had been built up over a long period of years, were extremely difficult to eliminate. It was only after several years of work that our hills were relieved of this evidence of antiquated



Bad Piece of Road in Lee County, Virginia, Before Improvement



Same Piece of Road in Lee County, Virginia, After Being Improved Under Direction U. S. Office of Public Roads

road maintenance and the centre of the road was made high enough to drain the water off.

With two Climax road scrapers the entire road was scraped to the centre. Much valuable macadam which had been knocked off to the sides and embedded there for many years was reclaimed, the ditches opened, corrugated culverts installed and the road otherwise thoroughly drained.

This work I consider to have been of the greatest importance in minimizing the damage by washing and by crowning the road, performing the first essential for the future application of bituminous binders.

Motor traffic, about four years ago, suddenly and almost without warning increased amazingly in a short period of time. Northern tourists finding better roads in the south commenced touring in large numbers. Many local machines were purchased and almost before we were cognizant of the change in traffic conditions, motor traffic was rapidly becoming our dominant traffic.

In 1908 the automobile traffic formed 5% of our gross revenue, in 1913 60%. In December 1909, the first month that we kept separate collections from automobiles and wagon traffic, our receipts from automobiles were \$80 and in December 1913 \$859.

In this connection it may be interesting to note that the gross revenues in three years have increased nearly 100%, without any increase in rates of toll. This increase being entirely in motor traffic, the income from wagon traffic has not increased.

It was soon found that the broken stone method was absolutely inefficacious to withstand motor traffic, the new macadam was knocked off the road and the foun-

dation was being rapidly disintegrated by the suction and shirring of automobile wheels.

The surface thus loosened and the fine dust particles, which under steel tired traffic, acted as cementing agents, were blown away.

The company then purchased two steam rollers and endeavored to roll in the loose rock, with light applications of dirt and dust taken from the sides of the road.

This method was more durable, yet because of the difficulty and cost of scarifying the old roadbed of cemented dust, proper incorporation between the roadbed and the new application was not obtained.

Also this method was so expensive as to be prohibitory.

The distribution of 800 to 1000 yards per mile, rolled in, cost from \$1000 to \$1200 per mile. The life of roads so maintained under our conditions of traffic was about two years.

As at that time we had about \$125 per mile yearly to spend for maintenance, obviously this method would have to be abandoned and a method adopted that would more effectually meet the new traffic conditions, brought about by the advent of motor traffic.

What method to select was extremely perplexing. The penetration method by reason of the cost could not be considered.

Surface binders were at that time in the first experimental stages and definite data regarding methods and material could not be obtained.

It was the earnest desire of the company to adopt some permanent method of maintenance which would

satisfactorily preserve the roadbed and come within reach of our income.

Another economic factor that made a change from the broken stone method desirable was that the accessible limestone, by reason of seventy years of use had become nearly exhausted and each year it was more costly and difficult to obtain.

Rough limestone which formerly cost 25 cents per yard, now cost 45 cents per yard delivered at the crusher making the cost of broken stone distributed on the road about 80 cents per square yard.

While it could be forecasted with safety that in a year or so, motor traffic would predominate, yet with the meagre information at that time available regarding road preservation and the great diversity of traffic on the Valley Pike, the difficulty in adopting any certain method, for the comparatively small amount of money available, can be appreciated.

So far as reliable data was concerned the economical maintenance of macadam roads by surface binders was in a chaotic condition.

With traffic varying from cleated traction engines hauling car loads of apples to heavy touring cars, travelling at high rates of speed; other heavy traffic such as a rich community would naturally have, heavy motor trucks delivering supplies to the farmers and gathering milk, butter and eggs, even then in contemplation of the road experts I consulted, none would venture to recommend any certain material which would with any degree of certainty satisfactorily preserve our roadbed and from a cost standpoint could not be considered.

After considerable investigation of different surface binders and consultation with the state and federal departments of roads and I will admit that with a certain degree of timidity and apprehension a contract was given for the application of a heavy asphaltic oil for thirteen (13) miles of roadway, twelve (12) feet in width, the oil to be of a viscosity requiring heating to 200 degrees and to contain not less than 86% of petroleum asphaltic contents.

This oil was applied by air pressure in two applications, the first application of a half a gallon to the square yard and the last one fourth gallon, each application being covered with stone chips from one inch to one-fourth of an inch free from dust.

The company applying the oil guaranteed that after treating, the surface of the road would be of an asphaltic top of such cementing value as to bind the surface together and to be practically free from dust and that within a year all pick-ups were to be repaired.

The cost of this application, including sweeping, distribution, oil, stone, covering stone and preparation of roadbed was 12 cents per square yard or \$884.80 per mile for twelve foot roadway. This treatment applied in the early spring of 1912 has given entire satisfaction. The only work necessary up to this time being the filling of a few depressions in the fall of 1913.

The only portion of the road so treated showing material wear is a section traveled extensively by cleated traction engines hauling heavy loads.

Our next contract was for a tar oil guaranteed to contain 98% bitumen to be applied hot one-third gallon to the square yard in one application. This treatment was guaranteed for a period of two years from application and the company making the application is obligated to perform all repair work.

Applied in the spring and summer of 1913 to thirty-five miles of road this treatment is at this time in excellent condition, the total cost being 5 cents per square yard or \$352 per mile for twelve foot road.

All of the bituminous work of the Valley Pike Com-

pany has been done by contract, the oil company sweeping the roadway under supervision, heating and applying the material by pressure, the Turnpike Company preparing the road surface, furnishing the stone and covering the application.

If a guarantee of the durability of the material is required, it is necessary to have some definite understanding as to the condition of the roadbed after being prepared.

Of necessity the road authorities will have to prepare the road bed for the treatment.

A guarantee covering the above that the Valley Turnpike Company has found satisfactory, is that the oil company must agree to the condition of the roadway before the application of the oil, having of course the privilege to reject any roadway that is not in suitable condition. Once accepted, however there can be no further controversy as to any defects that may later appear, which perhaps may be attributed to the preparation of the foundation.

This clause is as follows: "The Oil Company agrees to examine the surface of the road to be treated, and if accepted for treatment by the Oil Company, it shall be construed as an acceptance by the Oil Company of the condition of the road surface and no defense shall be made by the Oil Company to the obligations of its guarantee on account of defects developing in the binder that may be due to weakness or inequality in the surface of the turnpike to which the binder is applied."

I have reached certain conclusions based on the experience of the Valley Turnpike Company and by other investigations, on the use of bituminous binders, which may be of interest.

On macadam roads where the surface is exposed, permitting the foundation, the most costly part of road construction, to be disintegrated not only by traffic, but by the elements, I think that treatment by artificial binder is both economical and desirable.

Not only is a road so treated preserved from injury by automobiles, by the calks of horses shoes, but the foundation is made impervious to water.

I have been greatly impressed with the success with which the artificial binder treatment preserves roads from damage by washing.

Last summer immediately after the application of the tar binder there were several severe rain storms. The roadway on which the binder was applied was entirely preserved. In the ditches, whenever the material flowed, no washing resulted.

In order to determine what binder is to be used, a traffic census should be kept, so as to obtain the exact per centage of automobile, steel tired vehicles, traction engines, etc.

The most destructive traffic on this type of road is cleated traction engines. The binder is penetrated and disengaged from the foundation.

While the indentations so made are kneaded down by other traffic yet the adhesion between the binder and the foundation is broken.

The Valley Turnpike Company in past years has been a political foot ball, so to speak, of ambitious politicians desiring to curry favor with voters by reducing toll and otherwise restricting the management of the road.

I am glad to say that this attitude towards the Valley Turnpike has entirely disappeared; the people are proud of the road, of the desirable advertising that has accrued to the Valley by reason of it, appreciate the material advantages of having a well kept and modern road and realize that a road such as this can only be

maintained at the expenditure of a considerable sum of money.

However, the Valley Turnpike is still hampered by antiquated statutes. One statute established a rate for cleated traction engines.

Last year when apple growers stated to haul by cleated traction engines with wagons having four inch tires loaded with 30,000 pounds of apples over our bituminously treated road, we enjoined the owners of such engines and the court ruled that the fact that a toll was established for cleated traction engines in the statutes was practically legislative permission to use the road on payment of the toll stipulated.

A bill is now pending in the general assembly to compel the rendering of wheels of traction engines reasonably smooth when going on roads treated with artificial binders, providing first it is proven by due process of law that cleated traction engines do unreasonable damage to this type of road.

The Valley Turnpike in addition to treating fifty miles of its roadway as above stated has conducted experiments with different binders.

A demonstration section was put down by the Barrett Manufacturing Co., of "Tarvia" the amount of material spread per yard was about one-third of a gallon and covered with sand at the rate of a ton for two hundred yards.

The Standard Oil Company has the following demonstrations:

Binder A. four-tenths gallon per square yard.

No. 5 road oil one-half gallon per square yard.

No. 6 road oil one-half gallon per square yard.

The above being covered with three-fourths inch stone with the dust screened out.

The United States Asphaltic Company applied from one-third to one-half gallon per square yard of "Aztec" liquid asphalt and covered with approximately twenty-five pounds of sand to the square yard.

The above demonstrations applied in the fall of 1913 appear to be in good condition.

An experience with Glutrin indicates that this material is chiefly a dust layer and while it undoubtedly hardens the foundation, yet in order to be fully effective, I think should be covered with some bituminous binder.

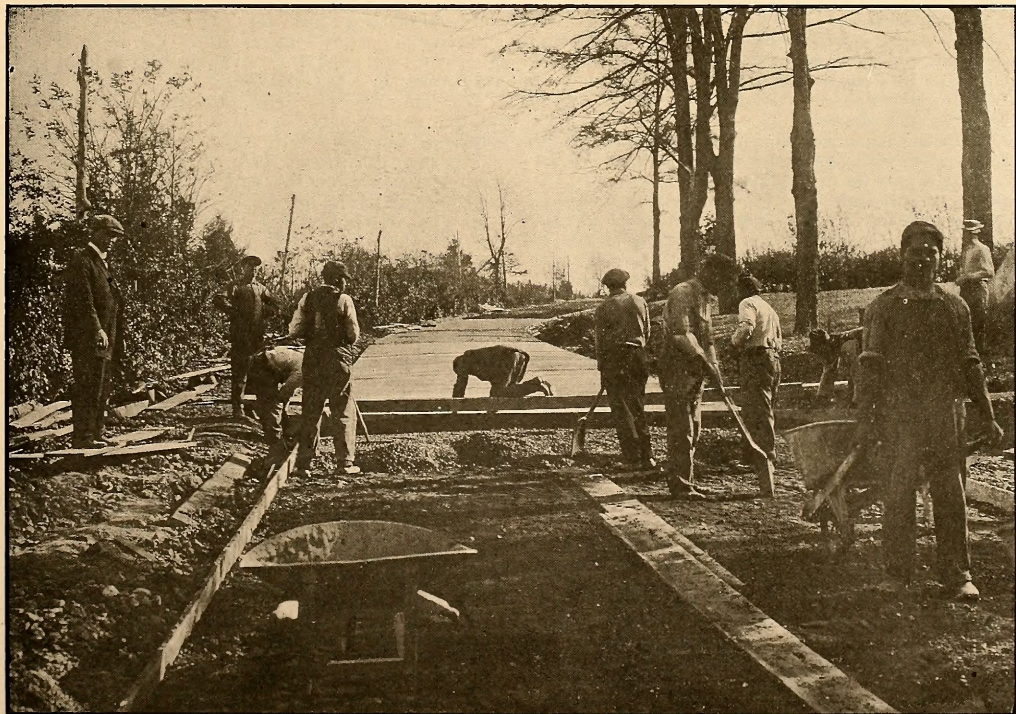
Roads with a preponderance of automobile traffic can in my opinion be maintained more satisfactorily with application of heavy tar or asphaltic oils applied hot and in two applications, each application being covered with stone chips.

When one-half gallon per square yard or more is applied more uniform distribution can be secured by two applications. The road is not apt to become bumpy or wavy as if all applied at a single application.

Heavy bituminous surfaces are often failures on roads where steel tired traffic greatly predominates.

During the first rainy season after the application of the material, the steel tired traffic and the horses calks cut up the surface, let the water in, penetrate the bitumen and produce a very disagreeable bitumen on mud. Without the beneficial effect of the wheels of motor traffic kneading down the bitumen, such roads will rapidly deteriorate.

For roads where steel tired traffic predominate, the thinnest possible treatment, which penetrates and is incorporated into the road surface, will give the best results.



Building a Concrete Road in Virginia. This Road is Between Farmville and Hamden Sydney College. It is Sixteen Feet Wide

In applying bituminous oils the following facts are important.

(1) The first and most important essential is adhesion and penetration into the roadbed. This can only be obtained by thorough sweeping. I have found a combination of the rotary broom, drawn by horses and the hand brooms to be satisfactory.

(2) The road must be thoroughly graded, as stagnant water is very injurious to bituminous surface.

In preparing a roadway for such treatment, it should be appreciated that bituminous surfaces are much more slippery than the original bare macadam and for that reason it is important to reduce the side slopes to a minimum, as horses slipping sideways are often injured seriously.

(3) After sweeping thoroughly, if the surface is sprinkled slightly with water before the application of oil, the remaining dust is converted into paste permitting a better adhesion to the surface.

(4) I find that the adhesion of bituminous materials to macadam roads is increased by applying the oil by pressure.

A pressure distribution seems to obviate the dust film between the binder and the road.

(5) A material should be selected which will allow the application of repeated layers. After adopting the bituminous treatment, it is economical to continue and secure cumulative benefits of repeated applications.

Care should be taken in future treatments so as to avoid the formation of such a blanket as to become unwieldy so the binder will roll and easily move.

(6) The wearing qualities of the stone chip covering a bituminous binder is of great importance, especially when the application is thin and the chips are not absorbed by the binder.

In a thin application the life of such roads is nearly entirely in proportion with the wearing qualities of the stone chips used as a covering, for that reason trap rock or rock containing a relatively high per cent of hard material is desirable.

Limestone is not so desirable by reason of its softness. It is best to analyze all rock used for covering binders, to ascertain the wearing qualities.

(7) In the preparation of the roadbed for treatment, I have found that depressions and ruts can be filled in and the surface made uniform more economically by the use of a tar material applied cold covered with stone chips. This material is known as "cold patch."

From my experience I believe that any reliable material used as surface binder, from either petroleum oil, tar, or natural asphalt as the basic properties, if applied properly to the prepared roadbed and with consideration to the traffic conditions, should give satisfaction. The cost of such treatment should not exceed 4 cents per square yard per year.

The Valley Turnpike since its inception has been self supporting, maintained and operated entirely by the collection of toll.

The maintenance of roads by the collection of toll is the most direct form of taxation. The burden is placed directly and proportionately on the users of the road, who receive the benefit.

If tolls are reasonable and equitable for all classes of traffic, if local parties who of necessity have to use such roads are sold yearly tickets at reduced rate, eliminating to such parties the inconvenience of stopping at each passage through the gates, if funds so collected are disbursed intelligently and judiciously, without undue profit to the operating companies, toll gates are not undesirable.

It is true that the cost of the operation and main-

tenance of toll gates, would be eliminated, by the maintenance of roads by general taxation, yet this is offset by the fact that foreign tourists who would otherwise escape any share in the cost of maintenance of such roads, under the toll gate system pay a proportionate share of the cost. Last year the cost of collecting toll on the Pike was 6% of the gross revenue.

It would be proper for the state of Virginia, if it so desired, to maintain a through thoroughfare, such as the Valley Pike, without the collection of toll, in view of the reciprocal privileges of free roads now being accorded by other states.

For the Valley of Virginia however, as would be the case under the present state law, to bear the entire cost of maintenance by local taxation, on the only improved state highway of any length which is a through route is manifestly inequitable.

By stringent state laws, by which toll gates can be abolished, upon yearly inspection, if such roads are not in tollable condition, the rights of the public so far as paying toll on roads not properly maintained are fully protected.

A system by which Turnpike Companies can be assured of receiving the full collection of toll is extremely difficult and I do not know of any system which would absolutely assure this result and which would not be cumbersome as to be impracticable for usage.

The first requirement of course is to secure conscientious and honest gate keepers and to pay a sufficient salary to attract such a class, also to furnish comfortable houses and other conveniences.

The Valley Turnpike does not attempt any system of espionage or exact checking at each gate. We require separate statements to be kept of the receipts from automobile and wagon traffic.

By comparison with receipts of other gates and with receipts of the same month of the previous year, it can be ascertained in a general way as to what gates are turning in proper revenues.

The company gives substantial prizes each year to the five gates making the largest per centage of increase as compared with the previous year.

This plan has proven effective and has encouraged greater diligence on the part of the gate-keepers in collecting all of the toll and making fuller returns.

At each of the terminal gates, through tickets are sold for automobiles, thus practically segregating the through motor traffic.

The Valley Turnpike Company issues tickets to local residents at a flat rate sold at a discount of 66 2-3 per cent from the estimated amount of travel of each resident.

The rate on these tickets is computed by keeping a record in two months in each year for the travel of all of the yearly toll holders, the estimate is then averaged up on a yearly basis, the discount taken off and the rate made.

As this system requires making a rate in advance it is very difficult to make this rate equitable and even with every precaution some users of the road are not paying uniform rates as compared with other users, considering the amount of travel.

Tickets good for twenty trips each are sold local automobilists at 50% discount and are punched at each passage.

There are a number of farmers in the Valley who pay \$2.00 to \$5.00 yearly, some even as low as \$1.00 and for that amount travel for themselves and families the entire year for light traffic.

Yearly tickets are sold only during the one month and approximately one thousand residents of the Valley avail themselves of this privilege.

Consideration Governing the Proper Location of Roads

By D. TUCKER BROWN

Organizer and Engineer North Carolina Good Roads Association

THE proper location of a road consists in determining and marking out those points on the ground through which the road should pass in order to satisfy as nearly as possible the requirements of an ideal road. These requirements for an ideal road may be divided into two groups:

(1) Those which make a road perfect from a technical standpoint; and

(2) Those which make a road perfect from the standpoint of serviceability to the country, both in regard to local and through traffic.

A section of the country is seldom found in which the requirements of both groups may be satisfied, and as there are certain limits to each, those of the first being more definite and important it is essential that they be more carefully observed.

Upon the first group depends the cost construction, maintenance and transportation; upon the second, depends the convenience to the community, and it will be readily seen that the effect of observing the first will be lasting while that of the second will be only temporary, if there is the proper development in the section through which the road passes.

In the first group these requirements for an ideal road are:

(1) As to direction; That it should be straight
(2) As to grades; That it should be level.
(3) As to cost, that the amount of work on grading, draining, mechanical structures, and surfacing should be the least that will make the road what it ought to be.

(4) As to exposure; That it should have the best. Those of the second group are:

(1) That it should be of equal benefit to all.
(2) That it should shorten the distance from every man's house to the point where he wishes to go.
(3) That it should run through every man's land where he thinks it should.
(4) That it should shorten the distance between communities and markets.

It is evident that to satisfy the requirements of the first group it is necessary that the ground between the termini of the road be a straight level ridge with adequate drainage to either side and sufficient exposure to the sun. And this condition is rarely ever met with in practice, and certainly not on roads of any great length. The country is usually so broken by mountains and valleys, hills and vales, as to present great difficulties to securing a location which will even approach the ideal, and the question which confronts the locating engineer is how to secure the best route that the topography of the country will permit, without sacrificing to too great an extent any of the requirements for an ideal road; and to enable him to accomplish this it is necessary that he have a general knowledge of those features of the earth's surface which govern the location of roads, and a more thorough knowledge of the topography of the country immediately adjacent to the proposed route.

I think it an undisputed fact that:

(1) Hills are the natural enemies to the road maker; and

(2) Water courses his guides and assistants.

It is, therefore, essential that he study their relations to one another, and the advantages and disadvantages which they present; and in this connection, the following facts will be of inestimable value:

(1) If a principal ridge is met by two secondary ridges at the same point, that point is of maximum height.

(2) If a principal ridge is met by two valleys at the same point, that point is of minimum height.

(3) If a principal ridge is met by a secondary ridge and a valley, nothing can be inferred.

(4) If two parallel streams with a ridge between suddenly diverge, the ridge between will be found to increase in height.

(5) If two parallel streams with a ridge between suddenly converge, the ridge between will be found to decrease in height.

For the purpose of determining the proper route through any section of country, so far as the requirements of group I are concerned, it is customary to proceed in the following manner:

A reconnaissance survey should be made of the region through which the road is to pass, and is generally made by the eye alone, without instruments. It is intended to be only approximate, and to serve to determine through what points routes should be instrumentally surveyed; and no time or labor should be spared in these first explorations, as they will save much exposure in subsequent detailed surveys.

Governing points will be found through which the road must pass; such as a low gap in a range, a narrow part of a river suitable for a bridge, etc., and between these ruling points the straight line joining them is marked out on a map and the routes adopted for instrumental surveys must continually tend to coincide with it, except when deflected to the right or left by weighty reasons, such as the topography of the country demands.

If a topographical map is at hand it will be of great assistance, and the facts mentioned heretofore reactive to hills and water courses will enable one to read the map more readily and accurately; and it is not infrequent that sufficient information may be obtained from it to enable one to decide what routes are the best to survey with the instruments.

After having studied carefully the topographical features of all routes and decided upon the ones to be surveyed with instruments, the next step consists in making the actual detail surveys. There may be necessary only one, and again as many as five, depending entirely upon how many routes meet so nearly the requirements as to make it impossible to decide upon the proper one without more specific information than can be obtained by a reconnaissance survey.

These surveys in order that they may be complete, should consist of a transit line, level line, cross section notes, classification notes, topographical notes and notes on all conditions which may in any way affect

the construction or maintenance of the road, and from the information obtained, the maps, profiles, and estimates should be made.

After these surveys are complete the work is in the correct form to enable one to determine which of the surveys is the best, as to alignment, grades, cost and exposure, and in general the following limits should be carefully observed on roads which are to be permanently improved.

The radius of no curve should be less than 100 ft., and if less the roadway should be widened throughout the length of the curve.

No grade should be less than 1% nor greater than $4\frac{1}{2}\%$. Grades between these limits provide ample drainage and there is little danger of wash due to the swiftly flowing surface waters.

The cost of construction of a road should be governed entirely by the saving made possible by any form of improvement.

If possible try to keep roads off of northern and western slopes of mountains, and if it is necessary to

of time, and it must be remembered that the traffic on a road will be materially increased by any form of improvement that will reduce the cost of hauling.

After estimating the traffic we are in a position to determine the costs of maintenance and transportation on any class of road for that amount of traffic and are also able to tell whether or not any contemplated improvement is a good investment and if not, what improvement would be?

In this connection, I will say that any improvement by which the interest on the money spent for construction plus the cost of maintenance and transportation is reduced should be undertaken without delay.

To demonstrate, suppose it was proposed to make a sand-clay road of an old earth road 10 miles long and that the following assumptions were true:

| | Earth | Sandclay |
|------------------------------------|-------------|------------|
| | Road | Road |
| 6% int. on original cost one year | \$ 180.00 | \$ 720.00 |
| Cost of maintenance one year . . . | 250.00 | 800.00 |
| Cost of transporting per year 20 | | |
| tons per day at 10c. per ton mile | | |
| on sand-clay, 30c. per ton mile | | |
| on earth | 21,900.00 | 7,300.00 |
| Total | \$22,330.00 | \$8,820.00 |

It can be readily seen that a community could easily afford to spend the difference between \$22,330.00 and \$8,820.00 or \$13,510.00 in improving the road for a traffic of 20 tons per day; and this does not take into account the possible development along the road after its improvement.

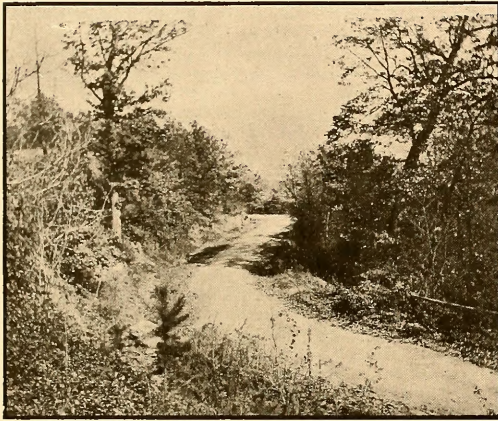
I now come to the consideration of the effect which the requirements of Group 2 should have on those of Group 1.

The requirements of Group 2 we can never hope to satisfy, for in each locality there are not only physical impossibilities but human impossibilities, and to carry out suggestions of those who have never seen a properly located road, but know every essential detail, would require the performance of miracle. I, therefore, feel a delicacy in dealing with Group 2. There are always so many people who can tell you the cheapest, shortest and most level route, and it is peculiar to note that their idea of the best route is the one which passes through their land where they wish it; that is, if they want the road, and misses their land entirely, if they do not want it.

The effect of satisfying local communities or parties so often necessitates a sacrifice of some one of the essential requirements of Group 1 and in consequence burdens the community with a road either costly in construction or maintenance, and I think it is a condition seldom found that we can afford to build a road connecting important points and sacrifice to any great extent its alignment, its grades, its cost, or its exposure, for even a rather thickly settled community. It is far better that less expensive roads be built from the main roads into such communities.

It may be well to note here, and it is a good point to bear in mind, when making locations, that a great deal of trouble with people may be avoided so far as right of way is concerned, if you find out before you run your line just where they wish it located. It frequently happens that through a man's land are two routes equally as good and his choice may be one of them, and the other may be just what he doesn't want. Furthermore, if you find out that the route you do not want is the one he doesn't want, survey it, and by so doing you can usually obtain the proper one without right of way cost.

I feel, that we will never get a road where it will re-



A Fascinating Bit of the Haw Creek Road in Buncombe County, N. C.

locate on those slopes, always try to have light grades, for if you do not, the snow and ice will be a continual menace during winter months.

Road location can therefore be summed up as follows so far as alignment, grades, costs and exposures are concerned:

To what extent may any one requirement of group 1 be sacrificed in order that one or more of the others of group one may be more nearly satisfied and the proposed location still remain within the limits of economy so far as the road as a whole is concerned? And the answer is, that if the alteration of any requirement increase the sum of the costs for construction, of maintenance, and of transportation above what it was before the change; then the change is unwarranted, and vice versa.

With the surveys spoken of heretofore, the cost of construction can be estimated very closely; but to determine the costs of maintenance and transportation, it is essential that a traffic census be taken.

This consists of an estimate from actual observation, if an old road is to be improved; and of approximations based upon the traffic that would be benefited, if a new road is to be opened; of the tonnage, number and class of teams which do or may be expected without much doubt to pass over the road in a specified length

main within the economic limits of the requirements of the first group, and satisfy to a great extent those of the second group, until we have the proper road laws, an absence of politics in road questions, and citizens who are willing to leave their road problems to those who have studied them.

However, I shall say a few words which I hope will be a help toward enlightening the people to the fact that good roads are money well invested, and how far they can afford to sacrifice the requirements of Group 1 for those of Group 2.

The question which is of paramount importance in making locations in so far as the requirements of Group 2 are concerned is:

Which route (if several are considered) will be of the most benefit to the most people?

The customary answer among the laymen is:

The route which passes the most homes.

I most emphatically insist that this answer is absolutely wrong and in answering the question will say that no change which increases the cost of construction or maintenance of any road should be made for the benefit of any person or persons, unless the increase in tonnage due to such change, is so great as to make the difference between the cost of hauling it over the unimproved and the improved road, greater than the interest on the additional cost of construction, plus the increased maintenance cost, plus the increased cost of transporting through tonnage over the additional section of improved road. For demonstration, suppose it is proposed to build a road between two towns or thickly settled communities which I will designate as A and B, and that the distance from A to B is D miles; also that at some point C not on the direct line from A to B there is another thickly settled community, and to go by C would increase the length of the road from D to E mile. Suppose further that the tonnage from A to B is T ton per year, that from A to C is T₁ tons per year, and from B to C is T₂ tons per year and that for simplicity the cost per mile for either route is N dollars and the maintenance cost for either route per mile per year is M dollars, that R is the usual rate of interest and X the cost of hauling per ton mile on improved road and Y cost on unimproved road.*

Then if,

$EY (T_1 \text{ plus } T_2) - EX (T_1 \text{ plus } T_2)$ is greater than $(N - EN - D)R \text{ plus } (M - EM - D) \text{ plus } (T - ET - D)X$, the route by C is justifiable and vice versa.

It must be remembered in making the foregoing deductions that a very comprehensive traffic census is necessary, and that the growth of traffic should be most carefully approximated. The same principle will apply to any routes of equal length where the difference in cost of construction, transportation and maintenance is due to excessive grades; and should a case of this kind arise, it will be well to be most careful in the estimate of the cost of maintenance, which increases very rapidly and not in proportion to the increase in grade.

I have not in the above taken into consideration the people who might have been benefitted had they not been at A, B, or C, but at some intermediate point; the principle is the same, however.

It might be well to show here a method of determining the region over which the benefits of a good road would extend.

(FIG. I.)

Let A B represent a portion of an improved road, lying between the two points A. B. at which cross roads come in. It is required to fix the points C C' D D' so that lines drawn from C and C' to A, and from D and

D to B, shall define this tributary area. B C or A D is to be found in terms of A B.

The ratio of improvement of the new road compared with the old, we will say is 2. i. e. it costs $\frac{1}{2}$ as much to haul over improved as it does over unimproved. If then, X plus n, divided by 2 is less than M, it will cost less to make the circuit from C to A through B than over unimproved road direct from C to A; and the cost of transportation on both routes will be equal when X plus n, divided by 2 = m.

But in A. B. C.

$$m = (X^2 \text{ plus } n^2)$$

Substituting—

$$X \text{ plus } n \text{ divided by } 2 = (X^2 \text{ plus } n^2).$$

Whence we obtain the value $x = \frac{3}{4} n$ —

Therefore from A and B set off at right angles to A B, B C, and A D each equal to $\frac{3}{4}$ A B, join A C and B D; and the areas included will be that within which it would cost less for the inhabitants to use the improved road, though with increased distance, than to pursue the direct but unimproved road.

It is to be regretted that our people have not realized the necessity of a traffic census on all roads which they contemplate improving permanently.

In conclusion, I shall call your attention to several points which if borne in mind will be of assistance to you in making locations.

(1) When possible cross streams at narrow points and at right angles.

(2) Make openings for all streams amply large.

(3) When following or crossing a stream be sure that your grade line is well above high water.

(4) If necessary to ford a stream, do so at a point where the least length of road will be subject to overflow.

(5) Make your streams crossings as well as gaps governing points in your survey.

(6) Cross streams where you can secure solid foundations.

(7) Generally speaking, when crossing a ridge parallel to a stream ascend down stream and descend up stream. This will shorten your line.

(8) Compensate for curves on maximum grades.

(9) When following streams the least expensive line is usually the one just above high water line.

(10) It is economy practically in all cases to cross a ridge at its lowest point.

(11) The aesthetic features should receive consideration but not at the expense of the serviceability of the road.

(12) Above all things, if you are ever called upon to locate a mountainous road, always go to the gap and work down on the proper grade to the stream below.

With very little money yet to raise the good roads committee of the Beaumont chamber of commerce will proceed at once with the construction of the 2,000 feet of road through the marsh in Orange county, Texas, to connect Beaumont with Orange county. The road will cost the people of Beaumont \$65,000, and all of it will be raised by public subscription. This will be the first public road ever built to connect Jefferson and Orange counties. The Jefferson county commissioners court has agreed to establish a free power ferry to operate across the river, connecting Beaumont with the new road and to later build a bridge when the increased traffic warrants.

Gaston and Mecklenburg counties, North Carolina, have at last agreed to build a bridge across the Catawba river at Mt. Holly. The total length will be about 400 feet and the bridge will cost about \$28,000.

Results of Good Roads Days in W. Va.

The following interesting items have been collected from the press of West Virginia, especially for Southern Good Roads, showing some of the results accomplished on good roads days, May 28 and 29, the majority of these dispatches being dated May 28:

The Huntington, Cabell county, good roads boosters returned to the city last night, tired, grimy and of woe! physical exterior, but happy in the consciousness of a good deed nobly done.

James A. Garner, chairman of the Chamber of Commerce Good Roads Committee, was highly enthusiastic over the result of the two day's work accomplished by the automobile squad, composed of Huntington business men and men under their direction.

Mr. Garner stated to the Herald-Dispatch last night that there is now a road open all the way from Huntington to Hurricane.

The automobile squad, with a complement of men and teams did yeoman service over many miles of the proposed Huntington to Charleston highway. They devoted the greater part of their time and energy to making fills and to clearing and otherwise improving the right of way. The road, however, on account of the absence of bridges at certain points, does not follow the proposed location the entire distance, but deviates from the proposed course at certain points.

Barboursville, Milton and Hurricane citizens turned out in fine force and manifested a splendid degree of patriotic interest in the work. Mr. Garner last night warmly praised Commissioner Clark, of the county court, and the local road supervisors for much of the success achieved. Automobiles, Mr. Garner said, now have an open road of good surface and good grade all the way to Hurricane.

Harrison and Dean, the contractors on the city paving which is being laid to connect the city paving at Barboursville with the county paving which extends from the corporation limits of Huntington to the Russell Creek bridge, will complete that work early today, thus removing an obstruction which has greatly impaired the usefulness of the county paving along Guyan river.

Other communities responded heartily to the call for work on the roads, and it is believed by the Huntington men who took part in the work, that much good has been accomplished in many other parts of the county as well as in that part toward the betterment for which Huntington men labored.

Williamson, Mingo County.

Today has been a gala day in the city of Williamson. Our citizens responded to the call for better roads in great shape and they turned out in working garb by the hundreds. Hosts of people came to the appointed places with tools to work and they went at the game they were to play with great zest and heartiness. It was a jolly, good natured crowd and contained the very best elements of our citizenship, from the mayor down to the legal profession. The crowds that gathered today shows public spirit of our people and their willingness to aid in anything for the uplift of the community. All classes mingled together in the best of good humor and their faces, full of determination showed they meant business. The work to be done had already been mapped out by the engineers and from east Williamson to west Williamson was one working mass for good roads improvement. The principal roads in this city to be worked are in east and west Williamson and it is on these roadways that the energies

of our people will be displayed today. Music by the city band enlivened the occasion and made excellent music. The city fire alarm sounded the time of meeting, so that none but the dead could fail to hear and understand that it was good roads day.

Students at Work.

Discarding their books and other worldly cares for a day, between fifty and sixty students at the W. Va. University, Morganton, (Monongalia county) took up pick and shovel today and assisted the Monongalia county road builders to improve a mile of road near the state farm. The fellows did every thing that a common laborer would do and tonight they are nursing sore muscles and blisters on their hands.

Marion County.

The good roads work of Marion county was entered into by upwards of three hundred men this morning. A heavy shower came up by the time the men had reached their stations and this made the ground ideal for working. A great amount of work was accomplished. The Boy Scouts figured prominently in the work by giving aid in various ways to the inexperienced laborers. Lunch was served by delegations of ladies in various parts of the county under the direction of Mrs. Geo. Debolt president of the Woman's Club of Fairmont. At the suburban home of Mayor Anthony Bowen a large number of working men were served a chicken dinner. The same plans of work will be carried out tomorrow.

Kanawha County.

The first day of the good roads was well attended in Kanawha county. Headed by Governor Hatfield, Secretary of State Reed, and Auditor Darst, 60 employees from the numerous departments of the state government, put in an active day on the Ruffner Hollow road and covered about two and one half miles. This crowd was augmented by a crowd of twenty under United States Commissioner Howard Smith, while in every magisterial district in the county groups of men abandoned their regular work and took up the pick and shovel. The total number for the county is estimated at eight hundred. County Road Engineer Burdette divided his time among the groups from this city.

Harrison County.

Harrison county citizens to the number of 1,500 according to the estimate of C. C. Pittro, county road engineer, turned out with picks, shovels road machinery and teams today and gave voluntary service on the roads of the county in response to Governor Hatfield's proclamation declaring today and tomorrow state good roads days. Clarksburg workers gave chief attention to the bad roads in the suburbs. Large numbers also volunteered in surrounding counties.

Wetzel County.

Over three thousand men worked the roads to-day in Wetzel county. The Dublin road and Pt. Pleasant road were put in excellent shape. Dr. E. S. Koontz, Jake Schubach and T. M. McIntire were instrumental in getting the people out and the good they did can be easily seen. Roads that were almost impassable are now in good shape and word comes from several districts that interest is also being taken throughout the county.

Tyler County.

A delegation of nearly one thousand men started out from here this morning to work the roads, among

whom were some of the most prominent business men in the city. The "Good Roads" spirit is strong here and liberal contributions have been received by those in charge from nearly all of the companies doing business in this field, as well as from many individuals. Ex-Mayor D. B. Thoenen is one of the most active men in the movement in this part of the state, and is out at the head of a squad to-day. Two hundred farmers also worked on the roads to-day.

Wayne County.

800 men with their teams are working on the roads to-day. Reports from every point indicate that much good will be done. All the county officials, physicians, lawyers and men of every profession are at work in person or substitute, with the enthusiasm great.

Two Good Roads Days a Big Success in the State.

30,000 volunteers helped to "Pull W. Va. out of the Mud." Reports received at the State Capital from all sections of the state indicate that there was a very generous response to Governor Hatfield's Good Roads Day proclamation and it is estimated that the average number of men on the roads on two days set apart by the Governor was in excess of thirty thousand.

Marion, Ritchie, Wetzel, Mingo, Greenbrier, Lincoln and Boone were the banner counties of the State in the greatest number of persons who worked on the road proportionate to the population of the counties. In these counties practically all business was suspended and the entire population spent the two days in helping to pull West Virginia out of the mud.

The proclamation of the Governor was the first of its kind in West Virginia and the great success of the occasion has been extremely gratifying. While the

purpose of the Governor in setting aside the two days for Good Roads work was largely to create public sentiment in the cause of improving the State's Highways, there was obtained through the labor of thousands of citizens of the State who turned out on those two days many hundred miles of permanent improved highways.

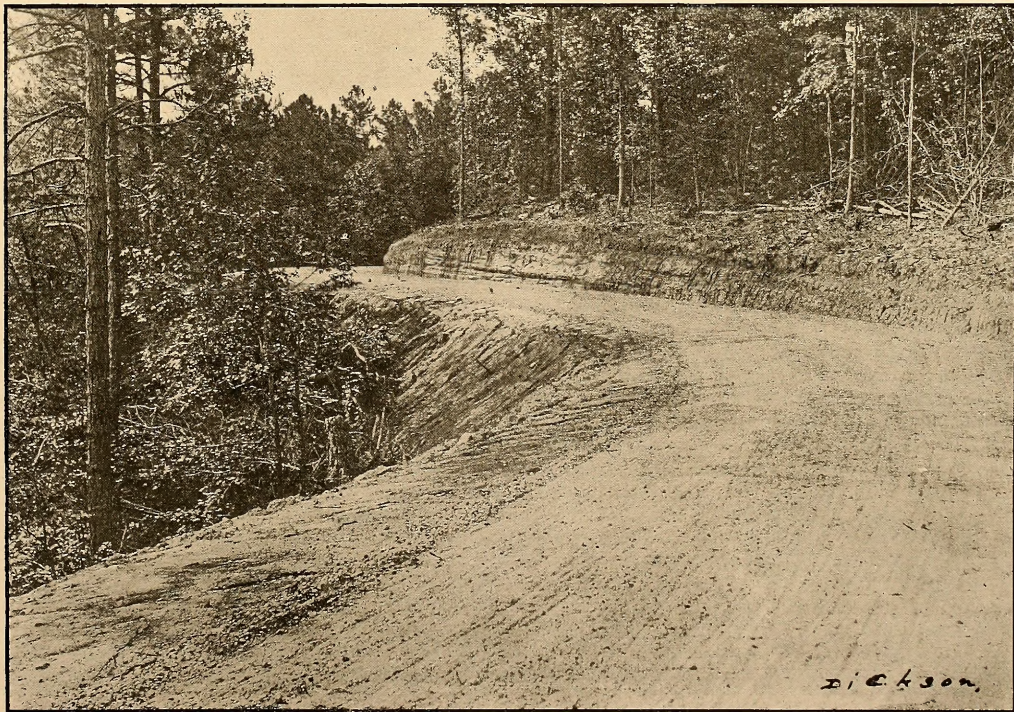
Governor Hatfield Thanks People.

"I desire to thank the people of the state heartily for the manner in which they responded to the Good Roads Proclamation and their co-operation in making a success of this movement," said the Governor last night. I am very much gratified at the interest displayed by the people in the effort to give West Virginia a system of good highways, which will mean so much to the development of the State and the promotion of the welfare and happiness of the people.

"I am not forgetful of the valuable assistance rendered by the women in exerting their efforts in making the occasion a success. They contributed largely in creating the wide-spread interest."

It is said to be the intention of Governor Hatfield to make Good Roads Days an annual event in West Virginia during the remainder of his administration because he believes that the people are in this way awakened and aroused to the urgent need in this state for better roads, and much permanent improvement is effected.

Newtown county, Mississippi, will construct many culverts in connection with road improvement to be undertaken soon.



A Stretch of Top Soil Road Building to a Bridge Approach. Near Little River, Lee County, North Carolina

Celebration of Completion of the Seminole Bridge, Pinellas County, Fla.

The completion of the Seminole bridge across Long Bayou in Pinellas county, Florida, was celebrated on the 21st. of May. More than 600 people were in attendance. There were speeches by Mr. F. A. Wood, county commissioner and candidate for the legislature, N. H. Longley and Arthur Norwood.

More than 100 automobiles were there and a big dinner was spread for everybody. The dinner was furnished by the Seminole people. The occasion was a very pleasant one in every respect.

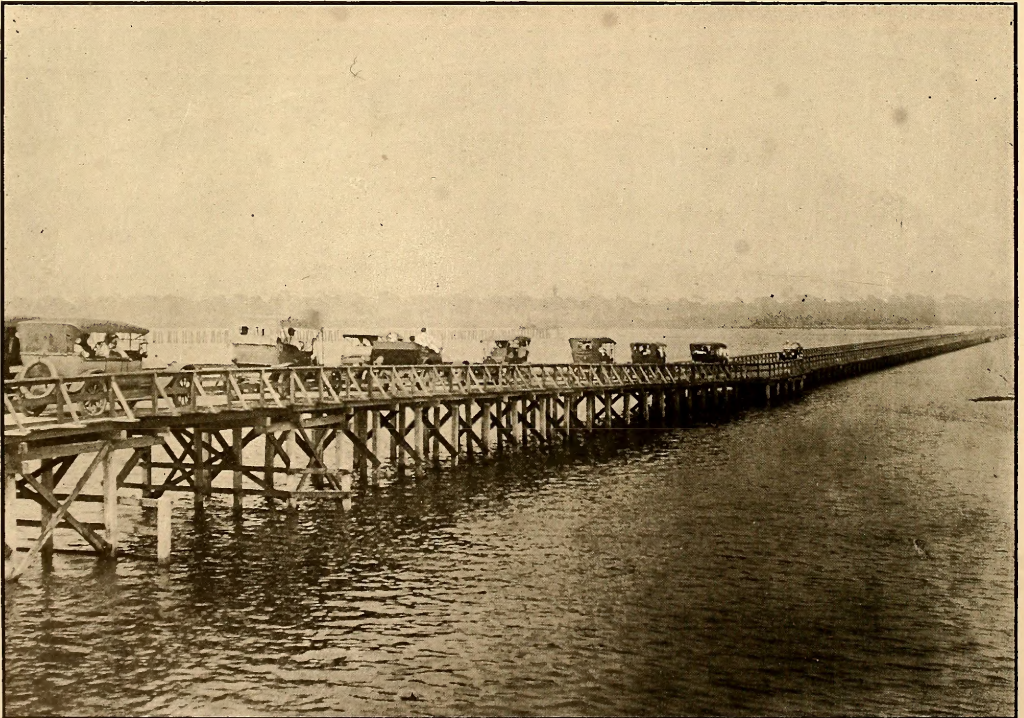
There was much interest in the attitude of Mr. Wood toward the highway question. He took a firm stand for the program outlined by the Florida Good Roads Association.

He dealt in length on the subject of roads and how people of the county can co-operate with the commissioners in road building. Mr. Wood explained in the beginning that the meeting was not a political one and that the sole object was for the purpose of getting together and celebrating the completion of a structure which will be the means of aiding in the co-operation of all sections of the county in movements for the common good.

Among other things Mr. Wood said: "The first act of our state, in my opinion, should be the creating of a

state highway commission. Let that highway commission submit to the legislature a map of main highways or system of trunk roads to be improved and maintained by the state and counties through which these lines pass. I do not believe merely in state and counties as in some states, as it would be utterly impossible for the state to improve every road in every county in Florida. That might accomplish some results, but in my judgment the first act of the legislature along this line should be to locate through a state highway commission a system of trunk lines and to make appropriations for their construction, improvement and maintenance. When our railroad companies undertook to construct a great trans-continental system of railroad, they did not stop at the boundary of every state, but traversed the continent. When these trunk lines were completed lateral lines were speedily built. The same results will follow the construction of trunk lines of highways in Florida.

"One of the chief purposes which would be accomplished by the creation of a state highway commission would be the centralization of authority and unity of action. It is now generally conceded that the construction of a good road requires scientific knowledge, skill and study. There were times when every board of



View of the Seminole Bridge, Pinellas County, Fla. The Picture Was Taken From the Center of the Bridge, Looking East, on the Day of the Celebration. The Bridge is 2,392 Feet Long

county commissioners thought that their county surveyor could lay out a road, and that it could be constructed by men who were ignorant of the principles of engineering or road building. That time is fast passing, and therefore I would go a step further, and would recommend that no road should be constructed in any county in Florida until plans and specifications were prepared and approved by the engineers of the State Highway commission, and that no road should be constructed in any county that was not under the supervision of a trained engineer, or expert road builder.



View of a Part of the 600 People Who Attended the Exercises Celebrating the Completion of Seminole Bridge. Mr. Wood Delivering the Address

The waste of time, labor and material which has resulted from ignoring this essential is beyond calculation. I think we are compelled to acknowledge that the system which once prevailed in this and every other state of imposing upon the residents of rural districts and upon citizens between the ages of 21 and 45 the burden of road building has proven a miserable failure. No one can in justice defend a policy which imposes upon a portion of our population the entire burden of constructing the public roads in each county of the state."

Women Aid Highway Work in Oklahoma.

Club and society women in Geary, Oklahoma, have organized a women's auxiliary to the Geary Interstate Postal Highway association, for the purpose of co-operating with the local organization in furthering the interests of the interstate postal highway which is to extend to the Texas line on the west and to Oklahoma City on the east, connecting with other roads at these points. The women have taken hold of the work in earnest and have set themselves the task of purchasing and placing the poles which are to mark the highway from one end to the other. The poles are to be painted with red, yellow and black rings.

Field Secretary J. A. Whitehurst was over this part of the road early last month covering the route from Bridgeport to Geary. He delivered a short address at the Geary opera house as a part of the entertainment which was given one evening by the women's auxiliary to raise funds to purchase the poles with.

People in Geary are very enthusiastic over the proposed road and the local organization is co-operating with the interstate postal highway association in every way possible in furtherance of the project. It is expected that the road will be finished before the snow flies.

Alabama Good Roads Days, Aug. 13-14 15.

In 1912 the Alabama Good Roads Association inaugurated the movement of observing August 14-15th as good roads days. These days were observed by over thirty counties of the 67 counties and over 50,000 people worked the roads on these days. The success of these days were so marked that the counties that had observed them desired to continue the movement, so in 1913 over 75,000 people worked the roads in over 50 counties of the state.

Now, this year an effort is being made to have the days observed in each of the 67 counties of Alabama and it is hoped that from 100,000 to 150,000 people will engage in working the roads on these days. A movement has been started to have the women furnish meals to the road workers and to have every patriotic citizen work the roads, furnish teams or hire substitutes for the same.

Secretary J. A. Rountree who has charge of the executive work of the Alabama Good Roads Association is in receipt of quite a number of letters from mayors, probate judges and road officials stating that they are working up considerable interest in their respective counties to make these days a success.

Hon. John Craft, President of the Alabama Good Roads Association has issued a strong appeal to the people of Alabama urging them to observe good roads days and reiterates the facts what has been accomplished by working the roads on these days.

Every indication points to a wonderful success. It is to be recorded that Alabama is the first state in the union to officially start the good roads day movement and since it has started quite a number of other states have started to observe the same and it is estimated that 25 states will follow the example this year.

Governor Emmett O'Neal issued a proclamation to the people of Alabama urging them to take an active interest in observing good roads days and has given official instructions to road officials to observe these days.

Road Enthusiasm in Georgia.

The Atlanta Georgian early last month contained this encouraging little story:

The question of good roads is being agitated all over the country, but in Georgia the agitation is being put into work, and all over the state wonderful progress is being made in the building of good roads.

At the next meeting of the legislature, in June, there will be several committee, which will represent the very best people of Georgia, headed by Emory Winship, of Macon, backed by practically every owner of an auto or motorcycle in the state, which will bring before the legislature a petition to create a fund to meet the appropriation that is offered by the federal government of equal amount toward the building of good roads in Georgia.

Meetings agitating this question are now being held all over the state, and subscriptions are being obtained which will go toward the general fund, which, if this plan is successfully carried through in the course of several years, will make Georgia highways second to none in the United States.

With this enormous fund that will be gotten up and with the aid of convict labor now used rapid strides will be made, and roadways that are now practically impassable will be turned into perfect highways.

Probably the first of the motorcycle manufacturers to place its donation toward this good roads fund in Georgia is the Harley-Davidson Motor Company, which, of course, will be followed by other makers of motorcycles.

Planning Road Work in Mercer County, West Virginia

By W. I. LEE, County Engineer

Mercer county, one of the border and most southerly counties of West Virginia is located between latitude north 37 and 38 degrees, longitude west 81 and 82 degrees, thus position is practically on top of the Alleghany Mountains.

An election to bond the county for improved roads, was held on Dec. 30, 1913, for an issue of \$500,000 to be spent on roads as follows:

Bluefield to Princeton, Princeton to Athens, Bramwell to Roek, near Sand Lick to near New Hope, Bluefield to Bland county, Virginia, line on top East River Mountain. Bluefield to Bramwell, Coopers to State Line near Pocahontas.

The width of paved surface on the above roads to be twelve feet, excepting the road from Bluefield to Princeton which shall have paved width of fourteen feet.

The following roads to be permanently improved by grading, ditching, solidifying the surface and drainage, according to modern earth road methods: From

Mountain and Stony Ridge, where are located the large classification yards of the Norfolk & Western railroad, which has about sixty miles of track.

Princeton, the county seat, is located on the recently constructed low grade line of Virginian Railroad and has had a phenomenal growth in the last decade.

The farm lands are good, but are used largely for grazing purposes.

The road between Bluefield and Princeton is destined to become an important link in a trunk line highway south and to southwestern points by way of Bristol, Bluefield, Princeton, Athens, Hinton and northerly through West Virginia to Pittsburgh, Pa. Another connection to be developed in a short while will be from Lexington, Ky., by way of Jonesville, Virginia, Gate City, Lebanon, Tazewell to Bluefield.

Keeping in view the importance of this road, an engineering party commenced the survey from Princeton about April 1st, with instructions to limit curvature to a roads of 161 feet, and a maximum grade of 2% to the foot of Stony Ridge from this point to the top about 1700 feet the grade is 3.15% where we connect with a macadam road about two and one third miles from Bluefield.

Along the entire route of this road sandstone of only fair quality can be secured excepting about one mile south from the top of Stony Ridge where limestone can be secured all the way to Bluefield.

I have drawn the specifications here for unclassified excavation including clearing and grubbing, vitrified clay pipe, galvanized corrugated iron pipe, cement rubble culverts to three feet span, after which cement rubble sidewalls and reinforced concrete slabs are provided or an alternate design calls for reinforced concrete boxes (all sides reinforced) Bridges of the Concrete slab and girder type will be used to forty feet span.

To secure comparative data on paving, I have incorporated in the specifications two kinds of stone in base course for each class of pavement. To illustrate: broken stone macadam, (a) the use of limestone for all courses, (b) five inch rolled sandstone base course, three inch loose limestone wearing surface.

Four combinations of Bituminous Macadam (Penetration Method) as follows: (a) all courses limestone, or (b) base sandstone, wearing surface limestone with binder of native asphalt.

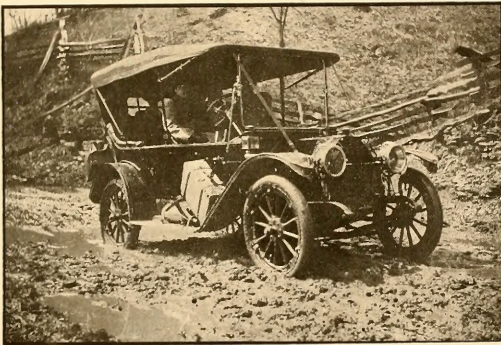
The same as (a) and (b) except that Oil Asphalt is substituted as binders.

Four combinations of Tar Macadam (Penetration Method) are also inserted with (a) and (b) as above noted and in the first case coast tar binder and secondly water gas tar.

Bituminous Macadam Concrete mixing with 4 inch Portland Cement Concrete for base course (a) limestone aggregate (b) sandstone aggregate, with two inch wearing coat in each case with limestone.

Also Portland Cement Concrete pavement, two inch wearing surface to be of limestone aggregate and (a) limestone in base course, (b) sandstone in the base course.

Bids are called for on clearing, scarifying and reshaping old macadam from top Stony Ridge to Blue-



A Section of the Road Between Bluefield and Princeton, West Virginia
The Picture Was Taken in 1913

Princeton by way of Oakvale to State Line near Glen Lyn, Athens to Lerona, Montcalm to Mora, Roek to Giatto, Giatto to Springton, Duhring to Goodwill. Flat-top yards to State Line near Pocahontas to be eighteen feet wide.

This county has an assessed valuation of \$33,057,092.00 which represents, in reality, the actual values based upon terms on which similar transactions have developed, and cash values on personal property.

The issue of coupons bonds bearing date of April 15th, 1914 are made payable in New York City, N. Y. thirty years from their date, interest payable semi-annually on April and October 15th., of each year.

These bonds are redeemable at the option of the constituted authority of the county, at any time after ten years from their date, and were sold at a premium of 1¼% and carry 5% interest.

The towns of Bluefield and Princeton are about twelve miles apart and have a population respectively of 17000 and 7000 inhabitants.

Bluefield in the southern part of the county is located on the summit of the valley between East River

field, and surfaced with a bituminous macadam.

The foregoing applies particularly to the road from Bluefield to Princeton and bids opened on May 9, 1914.

The remaining roads designated above will be located as rapidly as conditions will permit.

The construction organization will be centralized with assistants and inspectors as may be necessary to supervise the work.

Good Advice for Good Roads Days.

Hon. Frank Rogers, state highway commissioner of Michigan, sent out a letter to highway officials all over the state a few weeks ago relative to good roads days, June 4 and 5, in that state. The letter contains much that should have the careful attention of good roads advocates everywhere in preparation for this kind of work. Among other things he says:

Don't try to do too much.

Don't start more than you can finish. You cannot build a macadam road, nor very long stretches of gravel road in two days.

Don't haul gravel onto roads that have not been properly graded and drained.

Don't grade roads that have not been properly staked out on correct lines.

Don't plow up long stretches of road and leave them impassable.

Don't scrape sods onto the traveled roadway and leave them for passing vehicles to smooth down.

What May Be Done.

You can remove logs, rocks, stumps and stones from the roadway; fill holes, preferably with good earth, cover stretches of sand with clay or gravel; drain wet places in the roadway; scrape off and outwards sod margins where they hold the water in the traveled track. When drained and graded clay may be covered with sand or gravel, but the gravel should not contain any clay unless it is to be placed on sand. Culverts may be repaired or new culverts put in. Road drags (of planks or split logs) should be made and arrangements perfected for using them after rains, throughout the season on all clay or loamy soils.

Organization.

"All these things will be of great value to the roads of the state, but they will not be accomplished unless the work is well planned and performed under intelligent supervision. Let each community organize by road or school districts and appoint the best road builder in the neighborhood as 'road boss' for two days, and then turn out and work loyally under his direction. See how much real good can be done to the roads in your district to the entire 70,000 miles of rural highways in Michigan. Let us all give this first statewide 'road bee day' an honest, earnest trial."

Winners in the National Good Roads Essay Contest.

In a contest in which nearly five thousand children all over the United States engaged, two girls and a boy, all aged 14, have been awarded prizes by Logan Waller Page, Director of the U. S. Office of Public Roads for writing the best essays on the repair and maintenance of dirt roads.

So admirable was the essay submitted by Amy Coon, of Scammon, Kansas, and so well did she lay down the fundamental rules to be observed even by road engineers that the American Highway Association, in addition to the medal awarded by Mr. Page, has decided to send her to the American Road Congress to be held in Atlanta early in November, paying all expenses.

The contest was arranged by Director Page in order

to arouse interest among school children in the subject of improving the public roads of the United States. Mr. Page believed that if such a contest were started, the children would ask questions of their parents, and an impetus would be given to the road improvement. Thousands of children in all parts of the country participated in the contest. Many of the essays submitted bore evidence of having been prepared with the assistance of parents or school teachers and these were eliminated. The ablest engineers in the U. S. Office of Public Roads acted as a board in passing on the essays and in making the decisions.

The prize winners were the following:

First prize, gold medal—Amy Coon, Scammon, Kansas, a pupil in the Skidmore school.

Second prize, Lucille Huff, age 14, Willowdale Farm, Arlington, Oregon, a pupil in the Arlington school.

Third prize—Melvin Paulson, age 14. Blooming Prairie, Minnesota.

Those receiving honorable mention were: Robert Barrows, age 14, Mansfield Centre, Connecticut; George H. Rombough, age 11, Woodside, Lewis county, Idaho; Maurine Atkinson, age 15, Independence, Missouri; Frances Cochran, age 14, Wellman, Iowa.

Miss Coon will undoubtedly be the heroine of the American Road Congress in Atlanta if her parents consent to have her take the trip from her home in Kansas. The American Highway Association will not only pay all the expenses of the young lady but will see that she is well cared for by the wives of the local officials of the congress. Her essay will be read to the engineers and the other delegates who will attend the congress.

Miss Amy says that the chief reason why earth roads have received no attention and little improvement in the last 40 years is because they have not had sufficient place in the public mind.

"People seldom give the improvement of roads any thought beyond paying their taxes or working them and sometimes getting out of it all together. They then find fault with the road overseer.

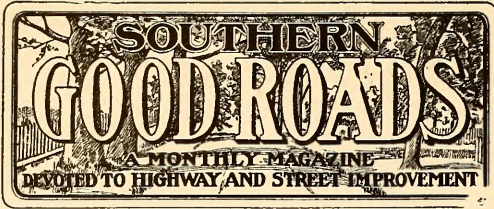
"Straight roads are desirable, but in hilly countries it is often necessary to make a winding road in order to have a level grade.

"After the road is properly located the next thing to be thought of is the drainage. A poorly drained road is very undesirable when after a rain or snow, the horses' feet and wagon wheels cut it up then it becomes impassable with mud, and then a freeze comes which leaves the road in a worse state than before.

"When the water is allowed to course down the middle of the road it washes out gutters and ruts that are quickly enlarged by the wagon wheels. This can easily be overcome by proper drainage."

Contracts for the construction and improvement of several miles of road in Macon county, Ala., and near Tuskegee, were let last month by the State Highway department to the Nixon Smith Construction company, the contracts totaling \$6,542. This work is to be done on the main line of the trunk highway running between Montgomery and Atlanta. Tuskegee is on the proposed highway.

Good roads and the development of rural schools were subjects of discussion featured on the program of the annual conference of parish school boards and parish superintendents, which was held at Baton Rouge, La., Wednesday and Thursday, June 11 and 12. The meetings were held in Garig Hall of Louisiana State University.



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HOW RANDOLPH BUILDS ROADS.

It is noted in our North Carolina department this month that Randolph county is moving for a road from Asheboro, the county-seat, to Greensboro, and a delegation of live citizens went over to Greensboro a few days ago, to put the matter up to the Guilford county commissioners. As the Guilford board is progressive and as the county has plenty of money for road-building, there was no difficulty about getting encouragement there. The Guilford part of the road, the commissioners said, will be built.

But how about Randolph? Unfortunately, that good county has not made provision for an adequate road-building fund and the county could not meet Guilford half way. Randolph's patriotic citizens stepped in and volunteered to raise Randolph's part of the money by private subscription.

Here we have an example of individual citizens actually taking the initiative toward the construction of an inter-county road and putting the matter up to a big, wealthy county. We consider that action worthy of praise and if any other section can show a case like it, we would like to hear from them.

It was stated at this conference that Randolph coun-

ty now has 70 miles of improved highway, all built within the past two years, and more than half of it built by private subscription. By January 1, 1915, they expect to have 110 miles of good road in the county, all built in the same way.

That is fine work and we would like to see the patriotic Randolph spirit spread to all parts of the South.

AN ALLURING PROSPECT.

Leslie's Weekly, speaking editorially of the advantages that accrue from good roads, ends with this very pleasing picture:

When children can go to school on roller skates, when the farmer can haul three tons of produce in spring, as well as in summer, with a team or light motor truck; and when the merchant can seek customers within a radius of sixty miles, and deliver goods to them economically, life in the rural districts will have undergone so radical a change that the "back to the farm" slogan will be changed to "don't forget the city," and the cherished hopes of the real good roads enthusiast will have been realized.

That is coming. The day will yet dawn in this beautiful southland of ours when you will hear no more about "back to the farm" but the cities will be howling for help. Good roads will bring that to pass.

In a news paragraph in this issue it is recorded that in Cuyahoga county, Ohio, which already has 400 miles of vitrified brick roads, nearly \$1,000,000 will be spent this year for more of the same sort of roads. It's a safe bet that there is no "back to the farm" problem in that county.

SEE AMERICA FIRST.

The men behind the Lincoln highway have a striking slogan that reads something like this: "See Europe if you will but see America first."

That is good. There is no such wonderful scenery in all the world, travelers tell us, as that offered in our own country.

Surely there is no battlefield, ancient or modern, not even the sanguinary Pass of Thermopylae, nor the plains of Waterloo, that possess such power to stir the blood of an American freeman as do the Alamo, or the forks of the Rosebud, out in Wyoming, where Custer and his men died.

Then why cross the ocean and spend a barrel of money among, avaricious foreigners, when not only finer scenery but places of greater historic interest await us in our own land?

If it is beauty you are looking for and vast awe-inspiring mountain ranges, turbulent soul-stirring torrents, go to our own southern Appalachian region. In North Carolina's far-famed Land of the Sky, in Virginia, Kentucky and West Virginia, are wonders that you know not of.

Clark county, Arkansas, will bridge De Roche river, connecting Clark and Hot Springs counties.

Independence county, Arkansas, will let a contract this month for a concrete bridge to cost about \$5,000.

An Experience in Highway Maintenance

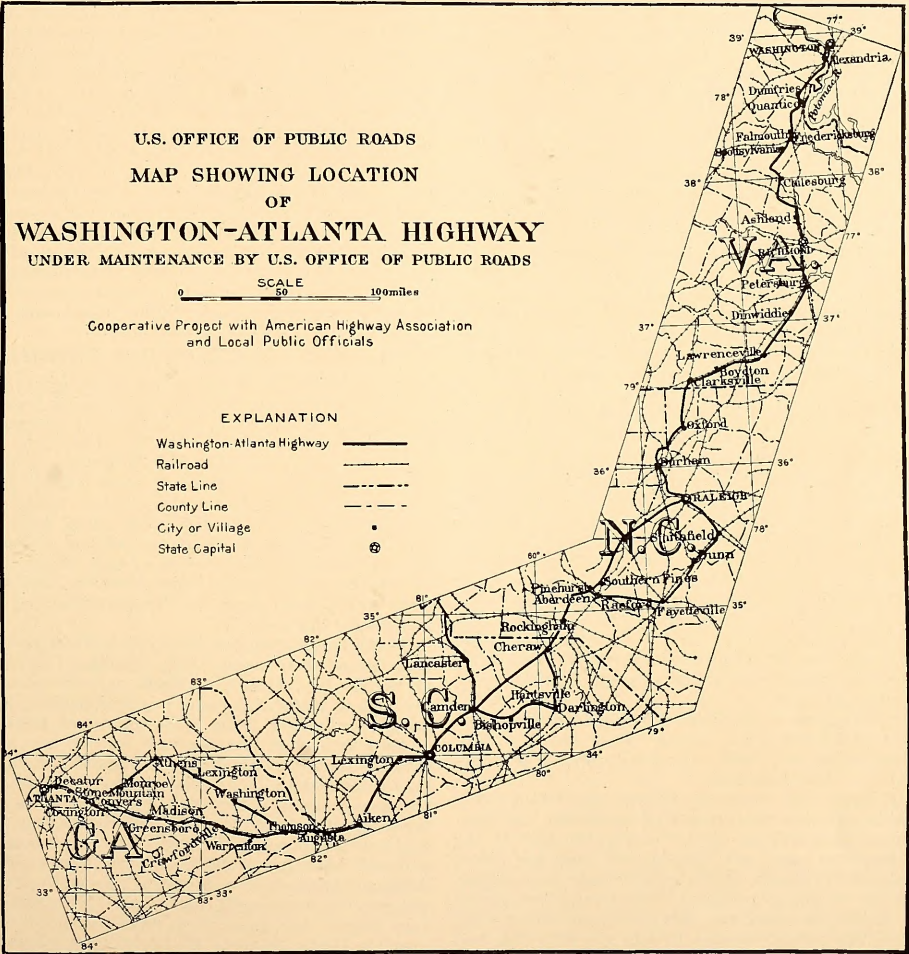
Under the auspices of the American Highway Association and the U. S. Office of Public Roads, the highway between Washington and Atlanta has been designated for an experiment in highway maintenance. The work is to be in the nature of an object lesson.

A map of this road appears with this. It extends for a distance of 892.7 miles through Virginia, North Carolina, South Carolina and Georgia and the three main sections of it have been placed in the hands of

South Carolina, 4 out of 8; Georgia, 12 out of 19; total, 25 out of 48.

The total miles placed under the direction of this office is 581.3 miles and the funds pledged \$27,525, distributed as follows:

| | Miles. | Amount. |
|--------------------------|--------|---------|
| Virginia | 75 | \$1,575 |
| North Carolina | 172.3 | 9,815 |
| South Carolina | 113 | 4,720 |



—By Courtesy of the American Motorist.

government engineers, who will supervise the work of maintenance. The latest report of the chief of the division of maintenance to the Director of the United States Office of Public Roads, has the following to say about the work:

“Applications have been received from the following counties along the route:

“Virginia, 2 out of 11; North Carolina, 7 out of 10;

Georgia 221 11,395
“Two counties in South Carolina, three counties in Georgia and two more counties in Virginia have signified their intention to enter the project.

“In several counties construction work, prior to maintenance, will be necessary, and arrangements are being made as cases arise to inspect and give general assistance during this construction; the same engineers

detailed to supervise the maintenance will have charge of the inspection and construction. This work is likely to assume large proportions, and although at the present time exact figures are not at hand for all lines, in North Carolina \$54,000 has been appropriated in three counties for the improvement of this particular route as follows: Granville, \$10,000; Johnston, \$40,000; Cumberland, \$4,000; total, \$54,000.

"The work of supervision is divided into three districts, as follows:

"Southern Section—Atlanta, Ga., to Augusta, Ga., 351 miles (two routes), George C. Seales.

"Central Section—Augusta, Ga., to Fayetteville, N. C., 295.6 miles, W. L. Spoon.

"Northern Section—Fayetteville, N. C., to northern terminus of road, probably Petersburg, Va., 246.1 miles, D. H. Winslow.

"In addition to the above, there are one or two alternative routes which will probably be incorporated in the maintenance project in the course of this present season. These are between Cheraw and Camden by way of Darlington and Hartsville; from Raleigh to Pinehurst by way of Sanford and a spur line from Camden to Lancaster in South Carolina to connect with the Charlotte road at the North Carolina state line.

"Application has also been received from the Board of Trade of Augusta, Ga., to investigate the possibility of extending the project from Augusta, Ga., to Jacksonville, Fla., by way of Savannah, Ga.

"Necessary arrangements have been completed for taking over the automobiles, and three Ford cars were placed in the hands of the three engineers detailed to the work on the 23rd of May, and are now in use."

Will Congress Sidetrack Roads Bill?

(By Dr. H. M. Rowe.)

Baltimore, Acting President, A. A. A.

That congress will adjourn and go into the fall elections without grasping the opportunity to win overwhelming popular approval by the enactment of federal road legislation seems unbelievable.

Rumors are afloat, however, that good roads legislation will be laid on the table at this session of congress, through a declination on the part of the senate committee on post offices and post roads to report the measure which overwhelmingly came to it from the house. If this is the case, the democratic party is disregarding a chance to achieve a brilliant strategic advantage in the coming election.

The voters in the rural districts are almost unanimous in favor of federal aid to roads. They are expecting and demanding such aid. Such opposition as exists is feeble and half-hearted.

Tariff legislation, currency reform, canal tolls, anti-trust bills, are all storm centers of discussion, but however important may be the policies advocated by the party in power, they are far removed from the direct interests of the people, and in effect create only targets for the fire of the opposition. To neutralize the attack which is sure to come, the party in power should not overlook this golden chance to win the affection and support of the country voters.

If the democratic party passes this opportunity up there will be many an anxious moment for the stump speaker when he tries to explain why, in all the multitude of legislative enactments, good roads were overlooked.

It is better to deal with the situation now from the standpoint of good politics than to wait until after adjournment, for then it may be that "all the King's horses and all the King's men can't put Humpty together again."

Coming Conventions.

Southern Appalachian Good Roads Association, Bristol, Va.-Tenn., October 6, 7, 8 and 9, 1914. H. B. Varner, Lexington, N. C., secretary.

American Highway Association and American Automobile Association—Fourth American Road Congress, Atlanta, Ga., Nov. 9-13, 1914. J. S. Pennybacker, executive secretary, Washington, D. C.

American Road Builders' Association—Fifth Road Congress—Eleventh annual session, Chicago, Ill., Dec. 14-17, 1914. E. L. Powers, New York City, Secretary.

Progress in Road Building.

In publishing a new Bermudez Road Book, the Barber Asphalt Paving Company emphasizes the fact that we now have five years' service experience upon which to base judgments as to the durability of asphaltic concrete and macadam. Following out this line of argument the illustrations are mainly confined to showing roads built in 1909 and 1910 as they look today. Among these are several 1909 roads that have cost practically nothing for maintenance. The New York state roads of this era, it is stated, are in much better condition than roads of later date. There are now more than 12,000,000 square yards of Bermudez roads in existence; the equivalent of 1,325 miles of 15 feet roadway. The cover of the booklet is something of a novelty, being a photographic reproduction of the surface of a penetration road, without a seal coat.

National Good Roads Days Suggested.

The United States Good Roads Association, of which organization Senator John H. Bankhead is president, is making an active effort to induce the people of the United States to observe August 14th-15th as good roads days. In 1911 Mr. J. A. Rountree, secretary of the United States Good Roads Association, as well as the Alabama Good Roads Association, inaugurated a movement to observe good roads days, August 14th-15th. The movement was launched and Alabama was the first state to observe these days. Since that time over fifteen states in the Union have commenced to observe good roads days, selecting various days of the months for the same.

At the last meeting of the United States Good Roads Association, a resolution was introduced by Governor E. W. Major of Missouri calling upon the governors of the various states to issue proclamations for good roads days, also calling upon the county and road officials and mayors to do likewise.

Since that meeting President Bankhead and Secretary Rountree of the association have conducted an active campaign in accordance with this resolution. Information has been received at headquarters showing that over a dozen governors endorsed the movement and will issue proclamations. Gov. Emmet O'Neal of Alabama has issued a proclamation calling upon the people to observe good roads days. The prospects are very bright that good roads days will be observed all over the United States. If the active work and persistent efforts of the United States Good Roads Association count anything, it will not be long before the whole nation will be observing these days.

Mayes county, Oklahoma, will bridge Grand river at Salina.

Bell county, Texas, will build a number of bridges and culverts in connection with the expenditure of \$255,000 on roads.

North Carolina Good Roads Association

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Miss H. M. Berry, Asst. Secretary
Chapel Hill, N. C.
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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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Up to the People of the Counties.

During past years vast sums have been raised by the people for the construction of roads. They have voted bonds, they have taken advantage of every act of the legislature permitting them to raise money for road purposes, they have borrowed money directly, they have solicited subscriptions from private citizens, and in fact have raised money from any and all sources in order that some section or sections of road could be graded, drained, macadamized, sand-clayed or otherwise permanently improved. In some instances they have given their own time and labor in order that a section of impassable road might be made serviceable at least one half of the time.

There has been no lack of interest on the part of the people, they have responded admirably to the call for better roads, they have given liberally of their time and their moneys.

These vast sums raised by the people in different ways for the permanent improvement of roads, have according to the law, fallen into the hands of the township or county officials, and it has been their duty to see that they were properly and economically expended.

To accomplish the wise and equitable expenditure of road moneys, it seems to me the natural and most practical step for county officials to take would be the employment of one who had had experience in building roads. It is preposterous to think that the ordinary layman can construct a road which will withstand to the best advantage the destructive effect of modern traffic. In many cases the officials have acted wisely and in many cases they have not. In some counties they have placed their road work in the hands of engineers and in others they have attempted to do it themselves. I ask the people, in which cases have the best results been obtained? Which is better, to have some one build your roads who knows how or some one who does not know how?

To go further, the county officials, those I mean who have employed competent engineers for construction, have concluded, that after the construction period, engineers are unnecessary. It is useless to say that those officials who failed to employ engineers on construction did not employ them after the construction period.

What has been the inevitable result of this? The roads no matter how well constructed have fallen into the hands of those who know nothing of their maintenance. Thousands of dollars of the people's money are tied up in roads and these roads are left to the

mercy of the traffic, the elements, and the botch work of inexperienced laborers.

I ask the people, is this the proper way to protect an investment? Do you let your schools, your court-houses and your jails rot and decay from inattention?

The necessity of maintenance is up to the people—are they going to respond?

* * *

An interesting news-letter from Winston-Salem tells of the rejoicing in Forsyth, Davie and Iredell over the securing of the federal appropriation for a highway through those fine counties.

These three counties will within the next year expend \$125,000 and more in making this one of the most model stretches of good roads in the state. The promptness with which these counties have acted and the merit of the route selected for this stretch of 79 miles of good road has attracted nation-wide attention, and in the state those interested in good roads, will watch the progress of the movement with interest. The location of this road and the consummation of the plans was given a big boost in the decision of Forsyth and Davie counties to erect a handsome \$31,000 steel bridge on the route. The prompt letting of the contract has expedited the matter to the point that a large portion of the work has already been constructed.

Chairman P. H. Hanes and the other members of the Tri-County Commission having the building of the highway in hand, have received many letters of commendation from many sections of the state upon the progressiveness of the movement. The assertion has been made that it will mean much in the accomplishment of the "Coast to the Mountain Highway" project.

This is an important project in the development of the interior section and of no small importance to the coast section. The project has been enthusiastically discussed and advocated by the North Carolina colony at the nation's capitol, especially since the appropriation of \$2,000,000 for the development of the North Carolina coast has passed the house and will, without doubt, be passed by the senate. The appropriation provides means by which the harbors on the Carolina coast will be excelled by none on the Atlantic. This highway will unite this great national enterprise with two other enterprises upon which the federal government is laying special stress—the national forest preserve and the United States army encampment grounds at Chattanooga, Tenn.

These two factors, together with the desire of the postoffice department to build a highway upon which to test the efficiency of plans proposed to improve the

mail service to the rural districts of the various states, has caused the building of the highway in North Carolina to be given serious consideration by the department at Washington.

At the recent conference of the Forsyth-Davie-Iredell commission with the officials at Washington, after learning that the proposed route in these counties does not parallel the railway and that the route through these counties will penetrate a section in which the mail service is in a low state of development, the officials without hesitation declared that it was one of the most meritorious propositions that has been placed before the department.

The highway is destined to be a very important one and will rival the Central Highway in attractiveness to tourists, as it really shortens the distance from Morehead City to the mountains. The new route will not, of course, take the place of the Central Highway for the route of the Central Highway is fixed by legislative enactment.

* * *

Greensboro-Asheboro Highway.

A delegation of citizens from Randolph county, backed by a committee from the Greensboro Chamber of Commerce, appeared before the county commissioners of Guilford county on Monday, July 6, in the interest of a highway from Greensboro to Asheboro, as a part of the Triangular Highway. This highway runs from Raleigh to Greensboro, from Greensboro to Fayetteville and from Fayetteville back to Raleigh. All of it has been surfaced except 46 miles, 20 of which are in the proposed Greensboro-Asheboro road. The Guilford commissioners assured the Randolph delegation that the Guilford part of the highway will be completed in time to meet Randolph at the line.

Mr. D. B. McCrary, representing the people of Randolph, stated that the people were raising the needed funds by private subscription and that they would be ready to begin work in about 30 days. He called attention to the fact that the people of Randolph have built 70 miles of high class gravel and sand clay roads in the last two years and more than half of it has been done by private subscription. By the first of next January they expect to have 110 miles of fine roads in the county, all built in the same way.

The committee from Randolph were: D. B. McCrary, chairman; S. W. Laughlin, W. J. Armfield, Jr., P. H. Morris, Arthur Ross, Kelly Coltrane, and W. C. Hammond, of Asheboro; and K. P. Deal, W. F. Calley and A. B. Beasley, of Randleman. Those from Greensboro were: C. G. Wright, chairman; Claude Kiser, R. D. Douglas, Julian Price and Dr. W. M. Jones.

* * *

Construction Work—Warren County.

The road work in Warrenton township is progressing rapidly and satisfactorily. The work is being done partly by the township and partly by contract.

The township officials made arrangements with Mr. D. Tucker Brown, field engineer North Carolina Good Roads Association, for him to make visits to the township and consult with Mr. S. D. Scott, the township engineer, whenever necessary. This arrangement has been most satisfactory.

Brunswick County.

Mr. D. Tucker Brown, field engineer N. C. Good Roads Association, was recently in Brunswick county and consulted with Mr. A. S. Kirby, commissioner of Northwest township, about the construction of that part of the Charlotte Wilmington Highway which passes

through Brunswick. Northwest township voted \$15,000 in bonds and has about 13 miles of road to build.

Arrangements were made for Mr. Brown to supervise the construction of the road.

Alamance County.

Contract was let by the town of Mebane for the construction of about 1½ miles of sand clay road. The work is being superintended by Mr. B. L. Field under the direction of Mr. Brown. Mr. Field is also looking after a piece of road running west of Burlington toward Greensboro.

* * *

Organization Notes—Craven County.

The New Bern branch of the North Carolina Good Roads Association was organized on June 19th.

Meeting was held in the room of the New Bern Chamber of Commerce. The following officers were elected:

Mr. Clyde Eby, President.

Mr. L. H. Cutler, Jr., vice-president.

Mr. O. C. Dunn, secretary and treasurer.

It is hoped that this branch of the association may accomplish a great deal for Craven county.

* * *

The county commissioners of Greene county have completed negotiations for the sale of \$100,000 of township road bonds voted several months ago. Work on the Greene highways will be increased by enlarging the force of men employed, and within twelve months the commissioners expect to have the best system of roads in the eastern part of the state. Specimens of modern sand-clay highways have already been completed to points some distance out of Snow Hill.

The South's Good Roads.

That the South has not been getting due credit for its work in road improvement is indicated by a booklet just issued by the Barber Asphalt Paving Company, of Philadelphia. The first three or four pages contain 1914 photographs of Trinidad sheet asphalt pavements in Washington, D. C., Charleston, Louisville, and New Orleans that are from 20 to 30 years of age. These views are followed by a score of pictures of the types of roadway now being built in southern states. Virginia, Maryland, North and South Carolina, Georgia, Tennessee, Alabama and Florida are among the states represented. Bermudez asphaltic concrete predominates but there are many fine examples of asphaltic macadam or "penetration" roads and of highways resurfaced with liquid asphalt carpet coats. Instead of this advanced road construction being confined to big cities and their vicinity it is more or less of a surprise to find that small towns are laying the best types of asphaltic concrete roadways and not infrequently on a cement concrete base.

American Road Builders.

The American Road Builders' Association has just issued an attractive booklet giving the proceedings of the tenth annual convention of the association held in Philadelphia, Dec. 9-12, 1912. It contains the revised constitution and by-laws of the association, reports of the officers and list of the active members of the association up to date of issue.

On July 13 Walker county, Ga., votes on a \$250,000 bond issue for roads.

The town of Ripley, Tenn., votes this month on a bond issue of \$16,000 for streets.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

Road building work in all Alabama counties will be hampered by a decision of the supreme court last month, which holds that cities are entitled to their pro rata and may use it in improving streets within their limits, according to W. S. Keller, state highway engineer.

Mr. Keller believes a change in the law should be one of the first measures considered at the next session of the legislature. By the court's decision several hundred thousands of dollars will be expended on streets instead of country roads, as it has been in the past.

"Through the decision of the supreme court many of the counties will be required to turn over huge sums to the cities," said Mr. Keller. "Cities benefit more from good roads than do the counties, and persons residing within city limits use the roads almost as often as do those outside. By all means the road and bridge fund should go entirely to the counties, and the next legislature should remedy this defect."

V. B. Atkins of Selma, member of the state highway commission, believes cities should be so interested in the construction of country roads as to allow the counties to reap the benefits of the fund.

A dispatch from Montgomery says that Montgomery's city commission has already revised its budget as a result of the decision. It has given the sanitary and health department a greater fund and sliced the street department's allotment, as it is depending upon revenue which Montgomery county must pour into the city treasury, an amount said to range above \$185,000 in addition to the yearly pro rata.

* * *

Arkansas.

The Little Rock Democrat notes that there is a plan afoot for a Good Roads Demonstration Train, similar to the "Arkansas on Wheels" project, but for the purpose of touring the entire state in behalf of better highways. C. W. Highfill, of Paragould, a member of the State Highway Commission, is agitating the movement.

It is the plan of Mr. Highfill to interest the three large railroads of the state, the Iron Mountain, Rock Island and Cotton Belt, to persuade the railroad officials to work in conjunction with the movement. He would have the train cover the entire state, insofar as is possible, for the sole purpose of urging better roads. The train would carry exhibits incidental to improved methods of constructing highways, literature and lecturers versed in the latest work in road building.

* * *

Illinois.

Sixteen thousand miles of paved country roads, half of the expense of which will be paid by the state, were assured last month when the Illinois supreme court upheld the constitutionality of the Tice good roads law.

Specifications have been completed in thirty-eight counties and work will begin early in July, according to A. D. Gash, president of the Illinois highway commission. He estimates that 180 miles of concrete or brick roads will be built immediately in sixty counties.

Cook county will build twenty-one miles on Halsted street, from Riverdale to Harvey, and on South Park avenue from Harvey to Homewood. Plans have been submitted to the county board and the state commission hopes to call for bids July 8 and award contracts July 15.

"The supreme court's decision means that we can proceed to build roadways with the \$1,100,000 appropriated by the last legislature," said Mr. Gash. "We have been working on the assumption that the law would be upheld and everything is now in readiness for actual work."

The law provides that all road building shall be under one system. Superintendents are to be appointed in every county. The law contemplates a total of 98,000 miles of roads. The state is to pay half the ex-

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penses of constructing 16,000 miles. The chief source of revenue will be the automobile license taxes.

The case came to the supreme court from the circuit court of Sangamon county, where Jacob Martins, of McLean county, asked an injunction to prevent State Auditor Brady from paying out state road fund money.

Advocates of the law have cited statistics to show that Illinois has ranked second in its road improvement expenditure and twenty-third in actual good roads.

Missouri.

One of the biggest road meetings of recent months in Missouri was that held at Macon on June 9th. The crowd in attendance was variously estimated at from 3,000 to 5,000. There were autoists present from Adair, Shelby, Marion, Randolph, Linn and Macon counties. The business houses and public buildings were closed.

There was a motor car parade in the forenoon to where the road machinery was at work. The speaking took place in the afternoon in the courthouse yard. Dr. A. B. Miller, president of the Macon Good Roads Club, presided.

Frank W. Buffum, state highway commissioner, said the people must get it out of their heads that the main object of good roads was for the accommodation of motor car owners. He said the real purpose of good roads was to enable the farmer to get his produce to town at a reasonable cost. He advocated the oiling of dirt roads four or five miles out of town. This would, in the course of a few years, produce a hard, smooth surface like asphalt. The use of tractors on the road work was the economical method. People along the county seat roads would have to show an interest in them or else they would wake up some morning and find the road had been given to some other locality.

Mississippi.

Word comes from Meridian, Mississippi, that work has already started on the great Mississippi State Highway.

The road will run from the Mississippi river at Vicksburg, through Warren county to the Hinds county line and Hinds county will build the road through to Jackson and the Rankin county line. The road will then run through Smith, Jasper, Clarke, Lauderdale, Kemper, Noxubee, Lowndes, Monroe, Lee, Prentiss and Alcorn counties to the state line at Corinth. A route is proposed to diverge in Clarke county and through the southern counties to the coast.

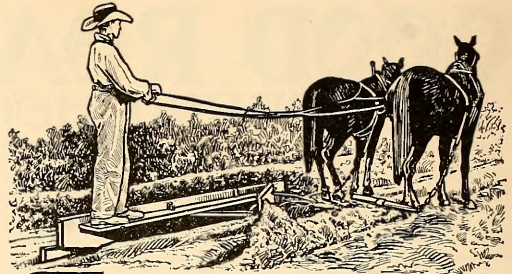
Through the whole route various parts of the road have been built and there only remains a few links to complete the highway through the state.

Lauderdale county has a system of the finest good roads in the south and is blocked on the north by Kemper county, which has not yet taken action in carrying the road through. On the south the same condition exists with regard to Clarke county, which has done practically nothing. On the west Newton county has issued \$125,000 good roads bonds and is already laying off its part of the work, but has not yet designated the point where the Lauderdale road will meet its road. The contract for the Newton county roads have not yet been let.

At Brandon, in Rankin county an effort to secure a bond issue is under way to carry the highway through Rankin county.

Through Noxubee county on the north to the state line, the highway has been practically built.

Lauderdale county, says the Meridian Star, is chafing under the restraint placed on it by the neighboring



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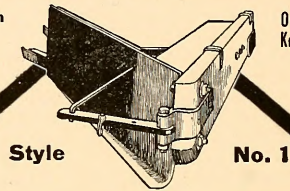
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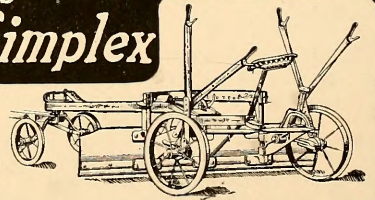
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counties. Everything is in readiness to build the road to the lines designated on each side and nothing can be done until the border counties act.

In the meantime good road building in Lauderdale county is going forward rapidly and all good roads under contract will soon be completed.

* * *

Georgia.

The Atlanta Georgian calls attention to the fact that Governor Slaton, in his recent "good roads" speech in Whitfield plainly presents some criticism leveled at the state of Georgia in the matter of its convict control, as contrasted with that of Tennessee. The governor does not think Georgia conditions are altogether ideal, but he thinks Georgia has nevertheless, a decided advantage over the Old Volunteer State in the systems, as compared.

In Tennessee the convicts are leased to manufacturing enterprises and worked in coal mines; in Georgia they are worked on the public roads.

The Governor denounced in unmeasured language cruel and inhuman treatment of convicts anywhere, stating that he favored kindness with firmness in handling them, with reasonable work. He opposes competition between convict labor and free labor.

The governor called attention to the fact that 80 per cent of Georgia's convicts are negroes, and that open-air road work is the very best sort of work for that class of labor. He contrasted the condition of the negro slaves in the south, who lived in well-ventilated houses, as a rule, with their condition since. Before the war tuberculosis among negroes was all but unknown. Unless forced to do so, negroes notoriously decline to live in the open air—particularly to sleep therein.

The governor's Whitfield county speech seems to have been well received, and has aroused a good deal of favorable newspaper comment.

* * *

Tennessee.

"We found much in Georgia's system of working and maintaining roads that is commendable," said Ben A. Morton, who was a member of the party consisting of several state road commissioners and Gov. Ben. W. Hooper, who traversed a large part of the state of Georgia recently seeking information as to that state's system of road building and convict labor on the roads, to a reporter of the Knoxville Sentinel. Mr. Morton stated that they found most of the roads in excellent condition and a credit to any state. He said that the good roads system there was due to the working of convicts on the public highways.

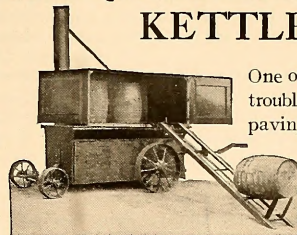
"While we found that conditions in some of the camps were not at all good, there was nothing about them that could not be corrected. In most of the camps I noticed that conditions were sanitary enough."

"Do you think that the same system could be used to advantage in Tennessee?" Mr. Morton was asked.

"Yes, I think that Tennessee would do well to use her convicts in improving the public highways. The imperfections of the system, bad conditions in camps, and so forth, could be eliminated. In fact, I believe that the work on the roads would be better for a majority of the men than work in the mines. Tennessee has her state mines, it is true, and must use discretion in the use of them because of capital involved, but I think that many of the convicts would be better off in the open, working roads.

"The advantages of the vigorous, open air work to the men themselves are worth considering. Some of the convicts are brought to the camps diseased and de-

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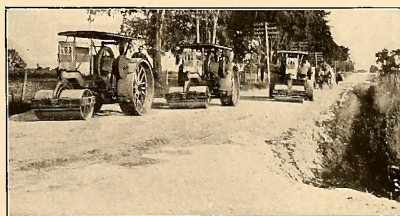
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The big economy factor in the I H C road tractor is this: In various capacities it can be kept at work every minute of the time—first, as a road roller—second, to pull grading machines, haul stone and other material, and move concrete mixer—third, as a belt power engine, to run stone crusher or concrete mixer. Several machines in one and it operates on cheap low grade fuel.

The I H C Road-Roller Tractor is a favorite because it is of simple mechanism; is economical in fuel, has moving parts thoroughly protected from dirt and grit; is always ready for work on the instant.

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bilitated. A few months of the road work puts them on their feet again. They sweat out the poison in their systems, throw off their ailments and are rendered hardy and strong. I understand also that most of the convicts prefer open air work to work within closed walls.

"There are some, of course, who do better to remain within the prison walls and learn a trade. Some are not strong enough constitutionally to perform the labor required of the road builder. These could be cared for at the discretion of the directors of the state prison."

* * *

South Carolina.

The preliminary survey of a government highway across Aiken county to cost \$30,000 has begun. The road will run from the Edgefield county line to White Pond, almost to the Barnwell line. Actual construction work will be begun within the next few weeks. The road will be twenty-four feet wide except at places where the travel will demand a wider road and in such places it will be thirty feet wide.

Aiken county contributes \$20,000 and the federal government \$10,000 of the money necessary to the construction of the road, which will be built under the supervision of Government Engineer Weir, who is already in Aiken, having established a temporary office there. It is very probable that the county chaingang, or at least a part of the gang, will do the labor, and it may be possible that an effort will be made to secure more convicts from the state penitentiary.

After the road is built it will be turned over to the county.

* * *

West Virginia.

A new departure has been started by the West Virginia prison management by sending about 40 convicted men down to St. Mary's, in Pleasants county, to work on some road improvements. The men went on their honor pledge and will sleep in tents. The state will get compensation for the work. The two day volunteer work was not a success in the upper Panhandle, only a few men turned out but down in Wetzel county about 3,000 men were on the roads. The Moundsville prison had a squad on the hill east of the prison farm.

The San Antonio Express devotes much space to an account of a motor boat race between Hon. John W. Warren, president of the Texas Good Roads Association, and Alderman Steves of San Antonio. The race was run over a course within the city limits, on the San Antonio river and it was the first attempt at opening this stream for navigation. Aside from the fact that Alderman Steves bumped into rocks all along the course and Mr. Warren ran under the waste pipe used in pumping water out of an excavation for a bridge across the stream and got a boat full of water and mud, the race was exciting. Mr. Warren, of course, won.

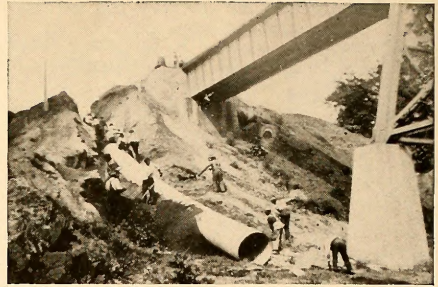
Baldwin county, Alabama, is preparing to construct two new bridges.

Marion county, Alabama, has contracts for a new bridge 400 feet long, across Battahatchie river to cost about \$6,500.

The commissioners of Bibb county, Georgia, are contemplating calling an election to vote on a bond issue of \$750,000 for bridges and culverts.

Henderson county, Kentucky, has been asking for bids on about 3,000 feet of corrugated metal culverts.

Louisville, Ky., will bridge Beargrass creek at Ellison avenue at a cost of \$12,000.



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GOOD ROADS NOTES IN BRIEF

Road district No. 3 of St. Charles Parish, Louisiana, votes on the 14th of this month on a bond issue of \$110,000 for roads.

Tallahassee, Fla., has a campaign on for a bond issue of \$47,000 for streets.

The city of Baltimore awarded recently contracts for additional paving amounting to \$109,000.

The Maryland State Roads Commission awarded contracts for state roads last month amounting to \$280,281.

Bell county, Texas, has contracted for the construction of 85 miles of road at a cost of \$255,000. The roads will be of gravel.

Collinsville, Okla., has awarded a paving contract amounting to \$79,000.

Houston, Texas, has contracted for grading and paving amounting to \$94,261.

Harris county, Texas, has started work on the Webster Air Line highway. A contract for a section of this road has been let for \$4,720.

Orlando, Fla., has contracted for 138,000 square yards of vitrified brick paving.

St. Joseph, Mo., has contracted for street paving amounting to \$52,000.

Birmingham, Ala., has ordered the paving of two streets at a cost of \$40,000.

Road district No. 2 of Milam county, Texas, will construct 40 miles of roads. \$150,000, the proceeds of a bond issue, is available for this work.

The fourth supervisor's district of Chickasaw county, Miss., will grade and gravel four miles of roads. The third district will build 9¼ miles of gravel roads. Newton county, Mississippi, will build 22 miles of improved roads.

Calhoun county, Texas, has contracted for five miles of good roads.

Arkansas county, Texas, will build 13 miles of improved roads.

Roanoke county, Virginia, will improve 72 miles of roads.

Baltimore county, Maryland, has been asking for bids on 13 miles of improved roads.

Dallas, Texas, will spend half a million dollars this year in paving 21 miles of streets.

The West Virginia Good Roads Association will prepare a route, or log book of the state, showing the principal highways of West Virginia, including the old James River and Kanawha pike, which crosses the state from White Sulphur Springs to Huntington, the Staunton and Parkersburg pike, the Weston and Gan-

ley Bridge pike, the Weston and Fairmont pike, the Fairmont and Morgantown pike.

Prof. R. P. Davis, professor of structural engineering in the University of West Virginia, has been made bridge engineer of the state and will be connected with the state highway department of West Virginia. Professor Davis has received recently from Cornell University the degree of Ph.D. He stands high in his profession.

The Maryland State Roads Commission has contracted for \$121,752 worth of road work.

Dickson county, Tennessee, has contracted for the construction of 100 miles of improved roads and many bridges and culverts.

In order to complete what is known as the island road, between Bristol and Abingdon, Va., R. F. Preston, S. P. Legard and others interest, last month began a canvass to raise \$15,000, which amount will be required to construct the unfinished link of six miles. The Preston committee had raised \$10,000 of the amount within a week and was confident the fund could be completed within a few days. Bristol business men contributed to the fund.

Chickasaw county, Mississippi, has contracted for the construction of gravel roads amounting to \$121,246.

Road district No. 2 of Lincoln county, Arkansas, has contracted for the construction of 22 miles of improved roads.

July 27-28 are the dates set for the convention of the Tri-States Good Roads Convention, which will be held in Medford, Ore. The original dates were July 17-18, but it has been found necessary to change them on account of other meetings and functions in Oregon, with which the good roads convention would conflict.



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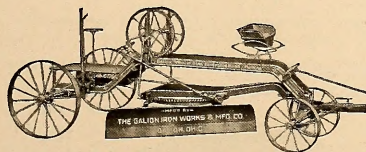
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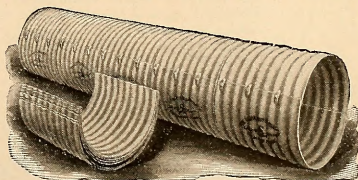


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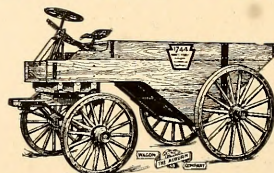
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I expect to increase this saving still more shortly, so that the investment which at first we thought was rather expensive is now the most profitable money that we have ever spent for equipment in our work.

There is no reason why this wagon should not be used by all turnpikes to good advantage.

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SOUTHERN GOOD ROADS

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Roads that Start Somewhere and End Somewhere

By GOVERNOR EMMET O'NEAL, of Alabama

THE CARES AND DUTIES of official life have been peculiarly exacting during the past few months, and although my presence here to-day made it necessary for me to break important engagements, I felt it my duty in view of the great movement in which you are engaged to render whatever assistance and encouragement my official position might bring by my personal attendance.

It has been universally recognized that the element which lies at the very basis of a country's civilization is a system of good roads.

It has been truly said that roads are the veins and arteries by which the circulation of the social body is carried on, and that where they are clogged the march of civilization is retarded. A people without roads is a people without civilization. Without cheap and easy methods of transportation there can be no commerce or social intercourse. Without good roads there can be no development of the resources of a state or any awakening of the energies and industry of the people. But it is useless for me to undertake to present the economic and social advantages of a system of improved highways. The whole field of argument on this subject has been exhausted, and I am sure that everyone present here to-day is a thorough convert to the inestimable advantages which always follow an improved system of highways. I desire simply by my presence to encourage you in this movement and lend official recognition to the cause you represent. You are the creators of public opinion. Through the active labors, the enthusiasm and the unselfish service you have rendered a mighty sentiment for good roads is not only sweeping over Alabama but the entire country.

Before I was elected governor I pledged the people of the state to use all the power and influence of my office to secure the establishment of a State Highway Commission; that I would be content if at the end of my administration it could be truly said that during the administration of Emmett O'Neal the movement in favor of good roads had reached its high water mark, and that more highways were constructed than at any former period in our history.

Coincident with the establishment of a highway commission at the beginning of my administration there has commenced in Alabama an era of road building without precedent in the history of the state.

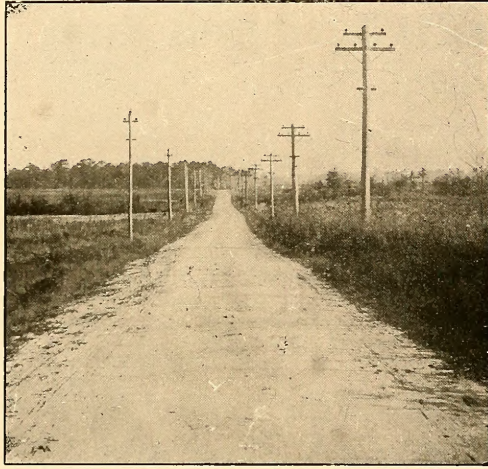
A report recently filed in my office by Hon. J. T. Gorman, an examiner of public accounts shows that for

the fiscal year ending September 30, 1913, the highway commission expended from the revenues of the state of Alabama the sum of \$182,583.98, an increase of over \$123,000 over the preceding year. Mr. Gorman states that it can be safely asserted that over \$500,000 have been expended by the state and the counties on permanent highways and that 54 counties have received state aid and the expenditures for the next fiscal year will largely exceed the amounts mentioned.

Under the law no money can be drawn from the state fund by any county until it has appropriated or made available a sum of money equal to the amount drawn from the state road fund. This money can only be expended for improvements of a permanent nature upon a main traveled road or highway and must be of public utility and convenience. The plan provided by the law by which sections of permanent highways are constructed in different counties of the state under the supervision of the State Highway Commission has furnished to the people of each county object lessons for the construction of good roads by the best scientific methods. I fully concur in the statement of the examiner that the creation of this commission has done more for the construction of good roads in Alabama than any other agency or instrumentality since its admission into the Union in 1819.

Notwithstanding a depleted treasury we have expended more for good roads during my administration than in any former period in the history of the state. I believe the affect of the law has been to stimulate a sentiment for good roads, so strong and overpowering as to force bond issues and secure speedy action in the different counties of Alabama toward the improvement of our roads. I do not believe that any other system could have been adopted which would have stimulated or aroused sentiment in favor of good roads more effectively than the law creating the State Highway Commission. Now that the act has accomplished the chief purpose we designed, the next step in my judgment that we should take is to carry out the provision of the law by submitting to the legislature a map of the main highways or a system of trunk roads to be improved and maintained at the joint cost of the state and counties. When the legislature adopts the location of the main trunk lines extending throughout the state north, south, east and west, I would advocate that the present law be so amended as to require that all the appropriations now made by the state shall be expended with the co-operation of the counties for the construction of these highways. In any permanent sys-

tem of highway construction the experience of those states which have been most successful admonish us that we must by state aid construct roads that start somewhere and end somewhere. I believe that when these main or trunk lines are undertaken and completed that the lateral branches will immediately follow. The money which the state has expended in each county will have accomplished its purpose by the time the legislature convenes. From that time forward a system of trunk roads should be adopted and the moneys of the state expended for their construction. If the present policy is continued indefinitely every county in



Fine Gravel Road Near Montgomery, Ala.

the state would be dotted with short lines of improved road commencing nowhere and ending nowhere. This was the criticism made upon the system which prevailed in Michigan in which Judge Lowe from that state stated that "Michigan had hundreds of miles of roads beginning nowhere and ending nowhere until it looked from the map as if that state had a sort of road small-pox." Recently the legislature of Michigan passed what is known as a trunk-line bill, providing for a system of trunk lines throughout the state. Similar conditions have been found in every state where the policies of state aid to counties was continued for too long a period of time. The policy of state aid to counties was necessary in the beginning of highway improvement. It has accomplished its results and in my judgment the first act of the next legislature should be to locate a system of trunk-lines and to make appropriations for their construction, improvement and maintenance.

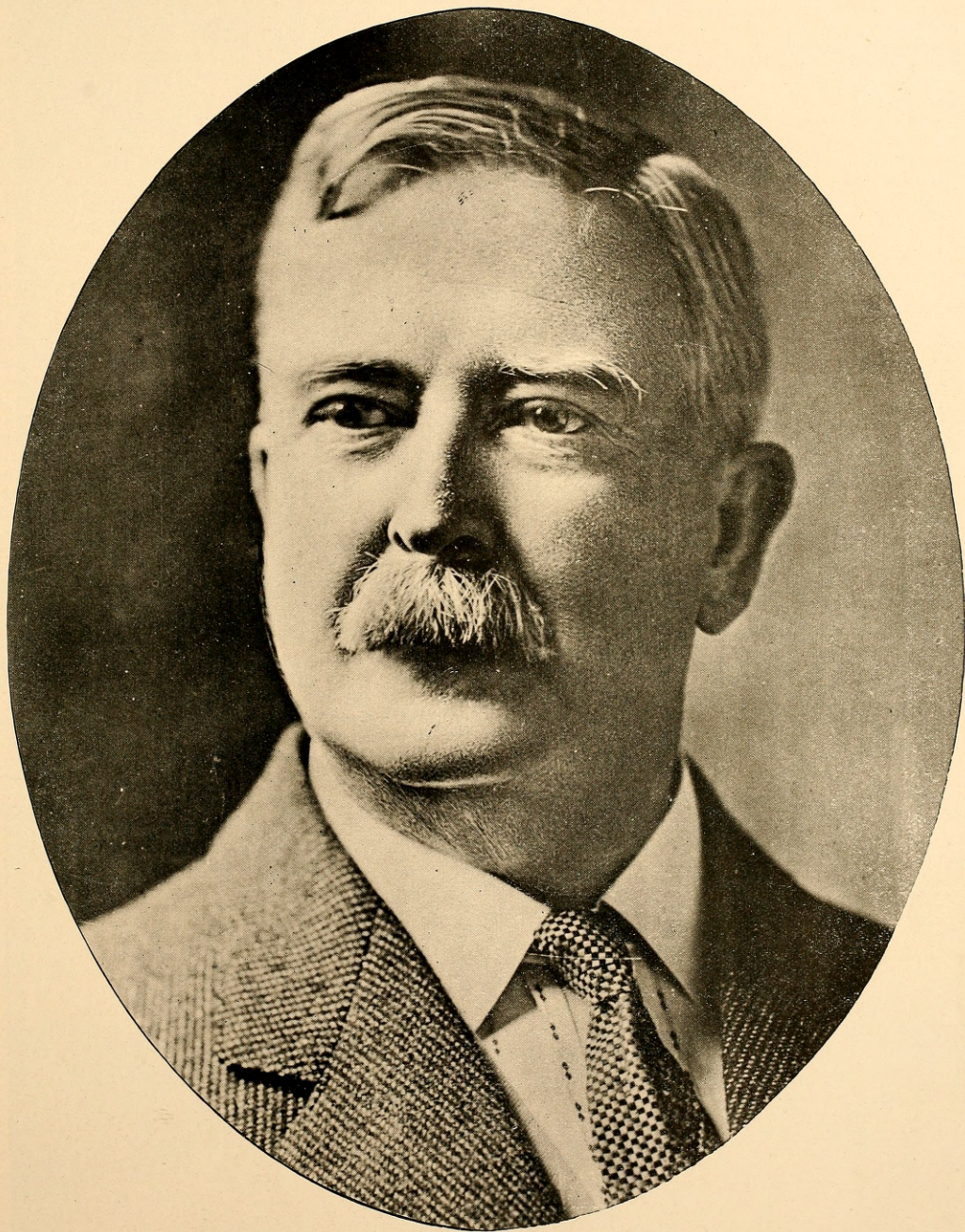
It may be said that it is important that the farmer should have a road from his farm to the county seat. It is utterly impossible for the state to improve every road in every county in Alabama. When the government undertook to construct a great transcontinental system of railroads they did not stop at the boundary of any state, but traversed the continent. When these trunk lines were completed lateral lines were speedily built. The same results will follow the construction of trunk lines of highways in Alabama.

It is true the farmers want good roads from the farm to the railroad. When the era of railroad building first commenced the farmers in one state did not think they wanted railroad transportation to other states, but on

the contrary short lines of railroads to reach near-by centers of trade. The question has been freely asked, Did they get them by short lines of railroad first? On the contrary the branches came after the trunk lines were built. We cannot reverse this law. A system of highways connecting the principal cities of the state must be furnished by trunk lines giving access to the markets and when the trunk lines are constructed short lines radiating from every county in the state connecting with them will be built.

One of the chief purposes which has been accomplished by the creation of the State Highway Commission is centralization of authority and unity of action. It is now uniformly recognized that the construction of a good road requires scientific knowledge, skill and study. There was a time when every board of revenue and commissioners court thought that their county surveyor could lay out a road and that it could be properly constructed by men ignorant of the principles of engineering or road building. That day has passed. We all know that under the system that formerly prevailed there was waste and extravagance, that labor and money was expended in building roads which through ignorance or improper methods of construction were soon destroyed by those two great elements, frost and rain. In improving the present law I would take a step further—a step which I recommended to the last legislature—that no road should be constructed in any county in Alabama until plans and specifications were prepared and approved by the engineers of the State Highway Commission, and that no road should be constructed in any county that was not under the supervision of a trained engineer or expert road builder. The waste of labor, time and material which has resulted from ignoring this essential supervision is beyond calculation. After a century of experience we are compelled to acknowledge that the system which formerly prevailed in Alabama by which the burden of road building was imposed upon the residents of rural districts and upon citizens between the ages of twenty-one and forty-five, has proved a miserable failure. No one can in the forum of justice or reason defend a policy which imposes upon a portion of our population the entire burden of constructing the public roads in each county of the state.

According to the recent census it is estimated that 46 per cent. of our population reside in the cities, and therefore, under the methods that have heretofore prevailed practically half of our population and two-thirds of our wealth have been exempted from the burden of maintaining the roads of the counties. If a system of good roads is to be provided for by the counties of the state the wealth and population of each county must be required to bear its burden. This can only be accomplished by a system of taxation or by so amending our constitution as to authorize each county to levy a tax alone for road building and a sufficient amount to insure a continuous and steady policy of road construction. In the absence of this constitutional amendment the only just and equitable method that remains is by the issuance of county bonds, for these bonds become a tax upon the entire wealth of the county and thereby equally distribute the burden of road building. Before any county, however, undertakes a bond issue it should be absolutely guaranteed by the report and supervision of skilled engineers that the roads constructed will last as long if not longer than the periods during which all the bonds are to run. In other words, that the roads builded should be of a permanent character. In my judgment the bonds that are issued by law should be paid by a system of amortization, a system which has been so successfully operated as to mortgages and



GOVERNOR EMMET O'NEAL, OF ALABAMA.

*North Carolina
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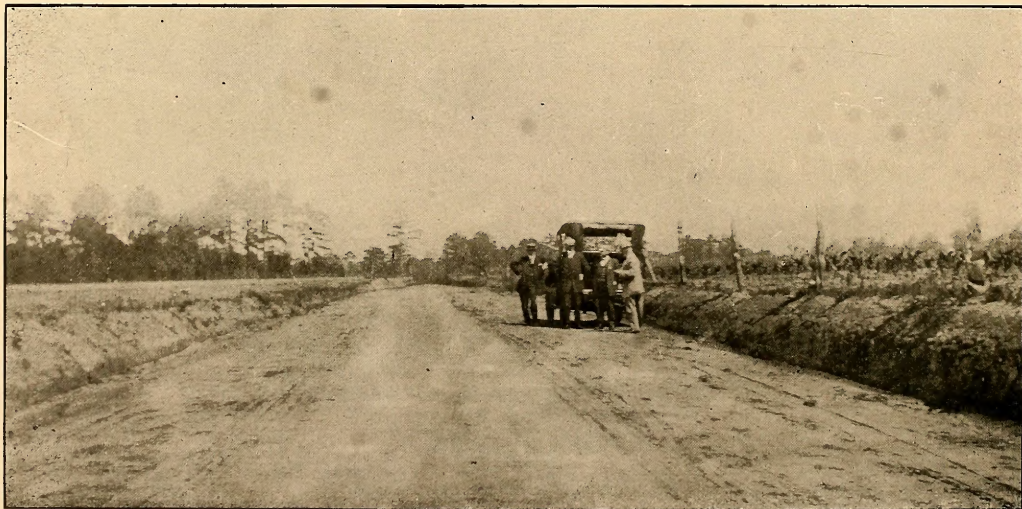
real estate in Europe and by which by the time the bonds mature interest and principal would both be liquidated. It is but just and equitable that future generations should bear some of the burdens. There has been considerable agitation in our state in favor of working the state convicts on the public roads. This power, however, is denied the state by the expressed provisions of the present Constitution. Before any movement of this kind can be undertaken a constitutional amendment would be essential. We should not overlook the fact, however, that even if an amendment was adopted permitting the state to work its convicts upon the public roads, that an enormous outlay for the preparation of such a policy would be necessary. As I recall, the state of Georgia expended about a million dollars in the purchase of mules, and road-working machinery before the policy was ever undertaken. The state, therefore, if determined to work the convicts upon the public roads, would necessarily have to purchase movable prisons or vans, mules, teams and road-working machinery, which outlay alone would necessitate the expenditure of over a million dollars. The revenues which the state now receives from the state convicts would necessarily have to be supplemented by additional taxation. The question of sanitation, the establishment of camps, the cost of supervision would all have to be carefully considered. Therefore, if the people should alter the present Constitution so as to permit the working of state convicts upon the public roads, in my judgment, the first step that should be taken is to appoint a commission composed of men of experience and intelligence to give careful study and consideration of the cost and advantages that might accrue and submit their report to the legislature for proper action. I am confident that after careful study, thought and consideration and without undue haste we can reach a proper conclusion on this important subject. A change so important and far reaching in the policy of the state must be wrought out after careful investigation, study and consideration of every phase and aspect of the subject and after all available material is compiled, and a report made upon which legislative action can be intelligently based.

Ladies and gentlemen: The high cost of living should

impress us with the necessity of taking speedy action to advance our agricultural conditions. We are too much inclined to boast of the increase of the population of our cities as an infallible test of our progress and prosperity, yet all history teaches that the progress and prosperity of any state must commence on the farm. Mr. Bryan uttered a great truth when he declared, "Burn down your cities and leave our farms and your cities will spring up again as if by magic, but destroy our farms and the grass will grow in the streets of every city in the country." The constant and steadily increasing drift of population from the farm to the city instead of being an evidence of advancement is an unmistakable warning that our entire social structure needs reorganization.

The growth of urban at the expense of rural population is one of the most alarming tendencies of the day. We all desire to see a steady growth of population of our cities, but if that growth is at the expense of our agricultural progress instead of being a blessing it becomes a curse. Our farmers are constantly complaining that it is difficult to keep their sons upon the farm. Many young men forsake the farm and are content to eke out a scanty subsistence in the city. Is it because wealth and fortune beckon to the young man just entering upon the journey of life? We know that in the turmoil and fierce competition now existing in the large cities of the land many who forsake the farm find only poverty and want and bitter disappointment. They yield to the lure of the city and yet wealth and fortune lay at their doors on the farm that they desert. It is evident, therefore, that we cannot advance our agricultural interests and secure that agricultural development which the high cost of living and our increasing population so imperatively demands unless we can stop this constant flow of our population from the farm to the city. How, then, can we improve agricultural conditions? The answer to this question can alone be found by consideration of the causes which have retarded our agricultural development.

One of the chief obstacles in our efforts to encourage and increase rural population is found in the isolation, the loneliness and social disadvantages of rural as compared with city life. How can this disadvantage be



Inspecting a U. S. Object Lesson Road in Alabama. Maj. V. B. Atkins, of the Alabama State Highway Commission, on the right.



A Beautiful Stretch of Macadam Running Three Miles From the City Limits of Huntsville, Alabama.

overcome? While rural delivery and the use of the telephone have marked an important step in improving conditions in our rural communities, they alone are not sufficient to overcome the most serious impediment to the growth of our rural population. Every thoughtful student of the conditions of rural life admits that the first and most fundamental step is to secure in every part of Alabama a system of improved highways, furnishing to the dweller upon the farm easy access to the county and state markets, increasing the attractiveness, overcoming the isolation and securing to the farmer those manifold advantages which good roads always furnish.

With a proper and adequate system of improved highways leading to every part of each county in the state and connecting with the main highways and trunk lines, which the state will, I trust, at no far distant date construct, not only will there be rapid and material advancement in farm lands, but the movement of 'back to the farm' will find a responsive echo in the hearts and minds of our people. The farmer will not be content until he has the same advantages of schools, churches and libraries enjoyed by citizens of the larger cities. How can these advantages be secured? The answer is "Good Roads." The experience of other states has demonstrated that one of the greatest economies resulting from improved highways is the opportunity it furnishes to lessen by concentration the cost of education, and to improve the tone and character of our rural schools and rural churches. With good roads—the automobile omnibus, and other methods of transportation, distance will be annihilated and that concentra-

tion will result which will not only decrease expense but furnish better educational facilities.

Another important advantage which will follow the construction of good roads is the encouragement of village and community life in rural districts. The system of antebellum days made village life unnecessary. The large Southern plantation was a reproduction of feudal life, independent and self-sustaining. Within the boundaries of the large plantation were carpenters, masons, blacksmiths, wood-workers, mechanics, mills and all necessary machinery for the successful conduct of farming operations. The abolition of slavery completely revolutionized the economic conditions that formerly prevailed in the South, and I believe that the most important step to encourage our agricultural interests is through a system of good roads to encourage the construction of villages throughout our farming districts furnishing the same advantages which were formerly furnished by the antebellum plantation.

We all recognize that absentee landlordism has been one of the greatest obstacles to our agricultural growth, and I hope the day is not far distant when we can replace the large plantation with its thriftless and wasteful tendency with educated and intelligent white farmers who reside upon their land and personally direct their farming operations. The necessary result would be that we would substitute intelligence for ignorance, improved and scientific methods of farming for the crude and ignorant system which now prevails on many of the larger plantations of the state.

That state alone will make the greatest progress whose people own their own homes, whose farmers not

only own but occupy the lands they cultivate.

The enormous wealth and prosperity of France is largely due to the fact that the great mass of her rural population own and occupy the lands they cultivate.

It has been truly said that notwithstanding our marvelous resources, our leadership in inventive skill, in manufacturing, in all the arts of peace, that the United States has the worst system of public roads of any civilized country on earth. The only reason that this country has made such marvelous progress is due to the fact that the locomotive was almost coincident with our industrial growth.

There are those who claim that the railroad obviates the necessity of good roads. That claim is unfounded. All of the products of this country must sooner or later pass over our dirt roads. The construction, therefore, of railroads, only makes it more imperative that there should be good roads over which the products of the land could be hauled to the railroad. Experience has shown that construction of every railroad makes absolutely essential, if progress is to be attained, the building of necessary highways, which become the feeders for the railroad, and without which there can be no industrial development.

We must not cease our efforts until the state is traversed by great trunk highways and every county has a system of good roads connecting with the main highways of the state, until Alabama has as perfect and improved a system of good roads as any state in the union. Until rural life is lifted from the mud and mire of the old mud road, until the home upon the farm is as attractive as a home in the city, until the farmers can go every day of the year to the markets of his county and his children enjoy the same advantages of schools, churches and libraries possessed by the dwellers in our towns and cities.

The public highway is the only system of transpor-

tation owned and operated by the people. In spite of the many mistakes which have been made, although in this great movement we have halted and stumbled, yet, we have made steady progress. We have begun to discover the mistakes we made in the past. We have realized that it is only by concentration of power and authority, the creation of a central board with full supremacy and control that the erection of roads that are permanent and durable can be accomplished.

Through your labors public sentiment has been crystallized, and the movement for good roads will not abate but will grow in strength and power until this necessary adjunct of civilization is possessed by the people of this commonwealth; until Alabama takes her place, first as she is in the roll of states, first in her splendid system of highways and cheap and rapid methods of communication among her people. The full realization of our dreams will bring happiness and cheer and comfort to our rural homes and will be a monument to the courage and enthusiasm, the indefatigable labors of this association, as enduring as the hills and mountains of our native state. Alabama is to be congratulated that she has in her midst a body of men who, forsaking their daily avocations have unselfishly consecrated their energies and abilities to this great movement, and whose labors and successful efforts entitle them to the thanks and gratitude of the patriotic and intelligent citizenship of this commonwealth.

In spite of unjust criticism, misrepresentation and slander, I am confident that the impartial judgment of the people of Alabama, when the passions of political contests have subsided, will do me justice and recognize that I have labored earnestly and faithfully in the great cause and have earned the confidence of the people for the progress during my administration by the creation of public sentiment and the increasing improvement of our highways.



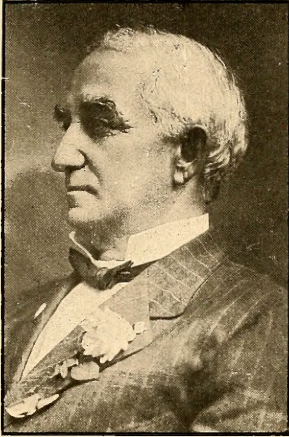
A Bad Piece of Road Near Selma, Alabama. Such Roads are Common in the Hilly Sections of Every Southern State.

The Good Roads Movement in Alabama

By **HON. JOHN CRAFT**

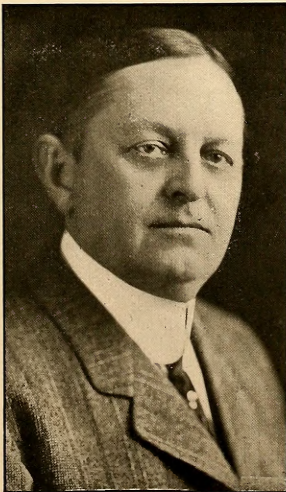
President Alabama Good Roads Association

ALABAMA has awakened to realize that she owns, operates and controls the only transportation system the people have to travel over, the country dirt roads, which have been neglected.



HON. JOHN CRAFT
President Alabama Good Roads Association, Member Alabama
State Highway Commission

The invisible mud tax of Alabama is one of the most burdensome the people have to bear. Every child, man, woman and all kind of business industries pay

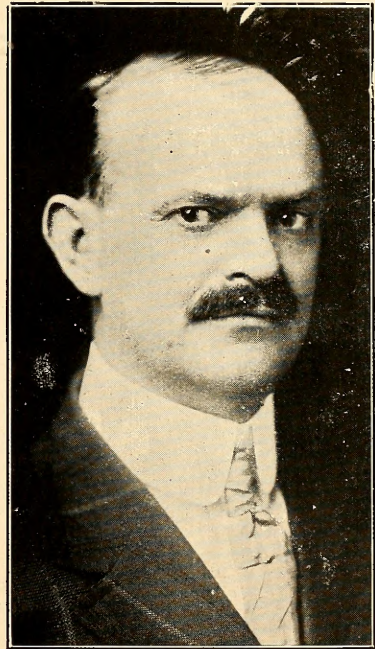


HON. OSCAR W. UNDERWOOD
U. S. Senator Elect from Alabama, Vice-President Alabama Good Roads
Association

tribute to the mud tax. Not even man's most faithful servant, the work animal, escapes its burden.

The Alabama Good Roads Association the pioneer and largest civic patriotic organization in Alabama is carrying on an active campaign of agitation, thereby educating the people who have been awakened through Alabama's first good roads Governor, Emmett O'Neal, the first statesman in the history of the commonwealth who has begun practical construction of roads and bridges along modern progressive lines.

Governor O'Neal recognized that the transportation system of the state which the people own, operate and control has been neglected too long, and this has retarded the growth and prosperity of the commonwealth. More than 90% of all the passengers and freight received and shipped to and from the farms



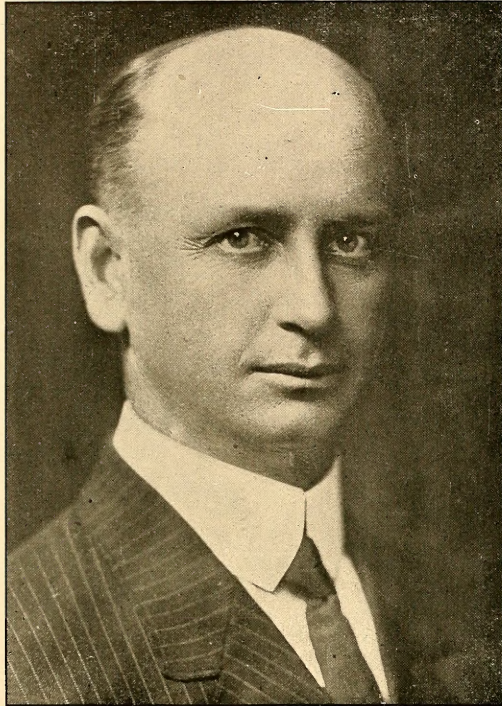
J. A. ROUNTREE
Secretary Alabama Good Roads Association

must first come over the dirt roads. At the beginning of his administration, under his leadership laws were enacted whereby a highway commission and a competent engineering department have begun correcting the mistakes of the past, which has been in vogue since the admission of the state into the union. Under the laws that have been enacted and promulgated by Governor O'Neal, the State Highway Department has made the greatest progress in the history of Alabama in the construction of roads and bridges. This has done much toward correcting the mistakes of the past and is putting the sixty seven counties of the state on business planes in their method of constructing the roads and bridges.

State aid has been given the various counties and

the greatest impetus in the history of the state has been the result. At the coming session of the legislature the highway commission will recommend to Governor O'Neal, a trunk system of highways for the state. This has the hearty co-operation of Alabama's Good Roads Governor, Emmett O'Neal.

The Alabama Good Roads Association three years ago inaugurated good roads days, Aug. 14th and 15th. Governor O'Neal has given this his hearty endorsement and has issued a proclamation calling on the people of the state to repair to the various precincts and become



HON. W. S. KELLER
State Highway Engineer of Alabama

interested in their own transportation system. Last year the governor donned his working clothes and actually shovelled and worked the roads, setting an example to the citizens of the state to make up for the neglect of the past.

The 18th annual meeting of the Alabama Good Roads Association will be held in Montgomery Oct. 21st, 22nd, and 23rd. Governor O'Neal has issued a proclamation calling on the various county commissioners, judges of probate, the commercial bodies and the citizens to attend the meeting. Distinguished speakers and experts on road construction and material will address the meeting. The city and county commissioners of Montgomery and the Business Men's League have invited the association to hold its meeting in that city which will be held in the auditorium of the Exchange Hotel.

The people of the state are very much interested in their county roads, and a state trunk system of roads should appeal to the law makers of the United States to give national aid for a great system of highways to radiate throughout the nation.

The United States government is great enough to maintain a judiciary and executive department, a modern army and navy, a liberal pension fund, it has constructed the Panama Canal, made appropriations for river and harbor improvement and it should have the

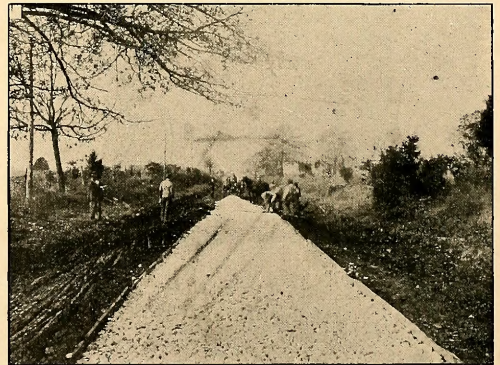


Chert Road Near Florence, Ala. This is a U. S. Object Lesson Road and had Been in Use 11 Years, Without any Expense for Maintenance, When This Picture Was Taken.

largest and most modern system of highways of any nation of the earth. America leads in everything but her roads. She should not be behind in her roads. The Alabama Good Roads Association will co-operate in trying to commit the government to highways in keeping with the grandeur of our nation.

American Highway Association and American Road Builders Association to Hold Joint Session in 1915.

A special meeting of the Board of Directors of the American Road Builders' Association was held at the Hotel Astor, New York, N. Y., July 17, 1914. At this meeting the matter of holding a joint convention or congress with the American Highway Association was



Macadam Road Near New Decatur, Ala.

given consideration and it was unanimously voted to hold such joint meeting in 1915, either in San Francisco or in Oakland, during the Panama Pacific Exposition, the exact date to be determined later. The management of this joint meeting will be in the hands of a committee of five made up of two members from each association, the fifth member to be selected by these four.

The Third Annual Report Alabama State Highway Commission

The third annual report of the Alabama State Highway Commission issued recently, is full of statistics. The work of the commission in every county of the state is set forth in minutes detail and there is much in the report that is interesting.

The report covers thirteen months, from March 1, 1913, to April 1, 1914. The first matter set forth is that the total expenditures of the department for sal-

| | |
|------------------|----------|
| Marengo | 4,000.00 |
| Marion | 2,000.00 |
| Marshall | 4,000.00 |
| Perry | 2,000.00 |
| Pickens | 4,000.00 |
| Pike | 4,000.00 |
| Russell | 2,000.00 |
| St. Clair | 2,000.00 |
| Shelby | 2,000.00 |
| Talladega | 2,000.00 |
| Tuscaloosa | 2,000.00 |
| Walker | 2,000.00 |
| Washington | 3,981.50 |
| Winston | 4,000.00 |

\$116,850.34

| | |
|---|-----------------|
| Other figures from the report worth noting, are: | |
| Amount spent on roads by counties | \$ 2,003,146.00 |
| Amount spent on bridges by counties | 529,638.00 |
| Amount spent on roads by State and counties jointly | 256,795.41 |
| Amount spent on bridges by state and counties jointly | 44,168.26 |

| | |
|--|----------------|
| Total by state and counties on roads and bridges | \$2,833,747.67 |
| Aid given by state on roads | 96,865.67 |
| Aid given by state on bridges | 19,984.67 |

Total aid given by the state

\$116,850.34

Number of miles of road built March 1, 1912, to April 1, 1913.

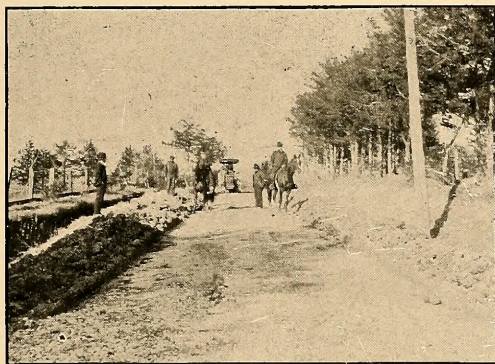
| | Graded. | T. Soil | Grav. | Chert | Mac. |
|-----------------|---------|---------|--------|--------|-------|
| By State Aid .. | 31.81 | 44.72 | 24.02 | 21.53 | 7.0 |
| By Counties .. | 531.70 | 170.00 | 153.30 | 101.75 | 44.75 |

| | | | | | |
|--|--------|--------|--------|--------|----------|
| Totals .. | 563.51 | 214.72 | 177.32 | 123.38 | 51.75 |
| Total number of miles built by state aid and counties .. | | | | | 1,130.58 |
| Total number miles improved March 1, 1913 .. | | | | | 4,641.81 |

| | |
|--|----------|
| Total number of miles improved road in Alabama April 1, 1914 | 5,772.39 |
| Number of miles of road in Alabama .. | 49,639.0 |
| Percentage of improved roads in Alabama .. | 11.63% |
| Number of counties that had constructed roads previous to 1911 .. | 30 |
| Number of counties that are now constructing roads .. | 60 |
| Number of miles of improved road in Alabama March 1, 1911 .. | 3,780 |
| Number of miles of improved road in Alabama March 1, 1912 .. | 4,641.81 |
| Number of miles of improved road in Alabama April 1, 1914 .. | 5,772.39 |

The State Highway Commission of Alabama, including members, officers and employees, and county highway engineers, is as follows: Members—Robert E. Spragins, Chairman, Huntsville, Ala.; Prof. G. N. Mitcham, Professor of Engineering, Auburn, Ala.; Dr. Eugene A. Smith, State Geologist, University, Ala.; V. B. Atkins, Selma, Ala.; John Craft, Mobile, Ala.

Officers and Employees—W. S. Keller, State High-



Preparing for U. S. Object Lesson Road at Uniontown, Ala.

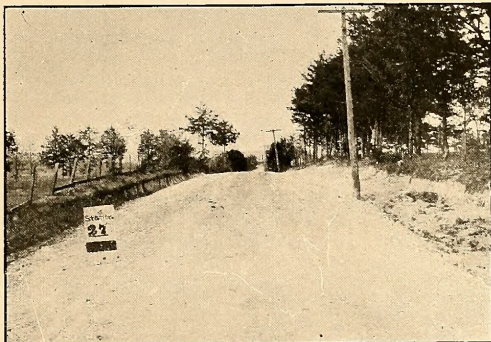
aries, travelling expenses, etc., was \$10,155.01 and then goes on to give the amounts appropriated and paid to counties out of the state highway fund, as follows:

| | |
|------------------|-------------|
| Autauga | \$ 2,000.00 |
| Barbour | 4,000.00 |
| Blount | 2,000.00 |
| Butler | 2,000.00 |
| Calhoun | 2,000.00 |
| Chilton | 2,000.00 |
| Clay | 2,000.00 |
| Cleburne | 2,000.00 |
| Coffee | 2,000.00 |
| Colbert | 4,000.00 |
| Coosa | 2,000.00 |
| Covington | 2,000.00 |
| Cullman | 2,000.00 |
| Dale | 4,000.00 |
| Dallas | 2,000.00 |
| DeKalb | 2,000.00 |
| Elmore | 2,000.00 |
| Etowah | 2,000.00 |
| Fayette | 3,290.98 |
| Franklin | 2,000.00 |
| Greene | 3,856.75 |
| Hale | 2,000.00 |
| Houston | 1,721.11 |
| Jackson | 2,000.00 |
| Jefferson | 2,000.00 |
| Lamar | 2,000.00 |
| Lauderdale | 2,000.00 |
| Lawrence | 4,000.00 |
| Lee | 2,000.00 |
| Lowndes | 4,000.00 |
| Macon | 2,000.00 |
| Madison | 2,000.00 |



way Engineer, Montgomery, Ala.; R. P. Boyd, Assistant State Highway Engineer, Montgomery, Ala.; F. O. McManus, Clerk, Montgomery, Ala.; J. B. Converse, resident engineer, Selma, Ala.; M. S. Bingham, resident engineer, New Decatur, Ala.; L. H. Hubbard, resident engineer, Fayette, Ala.; W. R. Koonce, resident

son county, Birmingham, Ala.; J. C. Harper, Lawrence county, Moulton, Ala.; G. W. Jones, Madison county, Huntsville, Ala.; S. E. Neill, Marion county, Hamilton, Ala.; T. D. Kemp, Marshall county, Gunterville, Ala.; Fay McClure, Mobile county, Mobile, Ala.; T. H. Edwards, Montgomery county, Montgomery, Ala.; Murk Finley, Tuscaloosa county, Tuscaloosa.



The Completed U. S. Object Lesson Road at Uniontown, Ala.

engineer, Dothan, Ala.; W. H. Thomas, resident engineer, Livingston, Ala.; S. E. Fitch, resident engineer, Opelika, Ala.

County Engineers—S. R. Batson, Blount county, Oneonta, Ala.; Blair Hughes, Butler county, Greenville, Ala.; Geo. H. Harris, Calhoun county, Piedmont, Ala.; Frank Gaines, Crenshaw county, Luverne, Ala.; Lot D. Jones, Cullman county, Cullman, Ala.; S. J. Cumming, Etowah county, Gadsden, Ala.; R. H. Cobbs, Jr., Hale county, Greensboro, Ala.; J. W. Gwin, Jeffer-

Mid-Summer Convention Texas Good Roads Association.

The mid-summer convention of the Texas Good Roads Association has been called to meet at Galveston, August 17, 18 and 19. The meetings will be held in the auditorium of the Galvez hotel. The Galveston Commercial Association, city officials, and others, have arranged to entertain the many visitors expected in the finest style. There will be boat rides, automobile rides, barbecues, and other pleasing features.

A very fine program has been arranged. There will be speeches by George D. Marshall, of the U. S. Office of Public Roads, Prof. R. J. Potts, consulting engineer Texas Good Roads Association, Hon. Jesse Taylor, national organizer National Highways Association, Mrs. March Culmore, head of the Texas Federation of Women's Clubs, S. H. Boren, president Dallas Automobile Association, T. L. Peeler, Industrial Commissioner, M. K. and T. Railway Co., E. W. Kirkpatrick, president Texas Industrial Congress, R. G. Christian, highway engineer, Smith county, H. B. Terrell, of Waco, and several others.

Warden Tynan of the Colorado state penitentiary, is also expected to be in attendance and deliver an illustrated lecture. All of the railroads have made low round trip rates and a big attendance is expected.

Economy in all of its angles is embodied in the question of good roads.



Not all Roads Around Selma, Ala., are bad ones. This, for instance, which is Surfaced with Gravel, is a Model of Its Kind.

Gov. O'Neal's Good Roads Proclamation

"The benefits, resulting from the observance of good roads days in Alabama, are so apparent that the custom, heretofore established, of setting apart certain days for work on our public roads and highways, should be continued. The active campaign for good roads, which has been conducted in the state for years past, has resulted in creating that public sentiment which must precede all important reforms. As our people are now united in their belief that better roads and highways are essential to our future progress and development, the days of controversy have ended and the hour for action has arrived.

"The observance of 'good roads days' not only intensifies public sentiment, but secures valuable improvements and repairs on our highways.

"Now, therefore, in order to lend official encouragement to this important movement, I, Emmet O'Neal, as governor of Alabama, do hereby, by this proclamation, name August 13, 14 and 15 as good roads days, to be observed in every county in Alabama.

"I earnestly urge that the probate judge in each county will at once designate some section of the public roads to be improved, during said good roads days, such improvement to be made under the supervision and direction of some engineer, or other competent person.

"I again renew the recommendations made in my former proclamation, to-wit:

"That after such section of the road within the respective counties is designated for improvement, that the probate judges, boards of revenue or courts of county commissioners shall cause to be made, written plans and specifications, describing how such improvements shall be made and be filed in the probate judge's office, and that each probate judge shall, prior to said good roads days, secure a list of all persons who are willing to work said roads, or to make contributions therefor, and invite all classes of our citizens, able to do manual labor, to meet on the 14th of August, along such section of the public road, so to be improved, at 7 o'clock on said date and to work and continue working such section of the public roads to be improved until the expiration of the said 'good roads days.'

"Let each county vie with the other in this important undertaking. Let our people imitate the example set by other states, where lawyers, doctors, bankers, merchants and all classes of the people contributed from one to three days' labor to the improvement of the roads within their counties, and by which method splendid results have been achieved.

"I further suggest that the mayors, or governing bodies of every city and village in the state, as well as the boards of trade, or commercial organizations, and the school boards of each county, and all other county officials, co-operate with the probate judge, and all who are unable to do physical labor to be requested to employ a substitute, and that all classes of our people be invited to make contributions in material or money.

"The probate judges of every county are requested to forward to this office the names of those persons who will contribute most liberally to the improvement of the roads during the good roads days, said names to be filed in the archives of the state, and to be published in the journal of the Alabama Good Roads association.

"I earnestly appeal to the citizens of the state to

make good roads days for 1914 memorable for the general interest that will be displayed and the great good that will be accomplished."

Woman's Auxiliary of American Highway Association.

Mrs. Robert Baker, chairman of the recently created Woman's Auxiliary Department of the American Highway Association, announced last month that she had completed her preliminary plans for organizing the women of the United States into a strong organization which will work continuously for the improvement of the roads of the nation, especially rural roads.

At a recent meeting of the executive committee at which Mr. Leonard Tufts, chairman, Hon. Logan Waller Page, Director U. S. Office of Public Roads and President American Highway Association, Mr. Fairfax Harrison, President Southern Railway, Mr. A. G. Batchelder, chairman executive committee of the American Automobile Association, Mr. Richard H. Edmonds, Editor Manufacturers' Record, and others were present, it was decided that a Woman's Auxiliary Department should be established to aid the women who have been working individually for better roads in their various communities.

The women of the country should learn the value of good roads, not only to the nation as a whole, but to individual women and children. It is the opinion of the officials of the American Highway Association that if the women had an organization through which they might obtain all needful information concerning roads and the most effective means of organization, inquiry and propaganda, they would become a powerful influence for efficient handling of road funds and adequate road building and maintenance.

"Millions of children in the United States," said Mrs. Baker, "are educated in rural schools and yet at certain seasons, because of the deplorable condition of the roads, the children are unable to get to school. Discipline is destroyed and the continuity of study is made impossible. Good roads will bring consolidation of the one room schools into graded schools and the use of school wagons."

"The country churches are not as a whole showing healthy growth and development, and it is upon these churches that the virility of the city churches depend. Women all over the land should rally to the support of the good roads movement when its vital influence upon the home, the school and the church is so plainly shown."

Arrangements are being made to hold a conference of prominent women under the auspices of the Woman's Auxiliary Department in conjunction with the Fourth American Road Congress, in Atlanta, Ga., during the week beginning November 9.

Many matters of interest to the association and the road congress were discussed at this meeting of the executive committee, and reports were made by the officials of both organizations. Among the things agreed upon by the committee were strong steps looking to securing the lowest possible railroad rate ever given to a road congress.

The officers of the Fourth American Road Congress reported that the exhibit space available, had been nearly exhausted and that it may become necessary to request the city of Atlanta to close and roof another street adjoining the auditorium. Indications point to an attendance breaking all previous records.

Annual Meeting of the North Carolina Good Roads Association

By MISS H. M. BERRY

Assistant Secretary North Carolina Good Roads Association

THE annual convention of the North Carolina Good Roads Association was held at Durham July 9 and 10. There were in attendance two-hundred and ninety-six delegates from forty-three counties and representatives from Georgia, Ohio, Kentucky, Virginia, New York, and Maryland. The counties represented were as follows:

Alamance, Brunswick, Buncombe, Cabarrus, Caldwell, Carteret, Caswell, Chatham, Cherokee, Chowan, Cleveland, Columbus, Davidson, Davie, Duplin, Durham, Forsyth, Granville, Guilford, Halifax, Harnett, Henderson, Iredell, Johnston, Lee, Lenoir, Mecklenburg, Moore, Nash, New Hanover, Northampton, Orange, Perquimans, Person, Randolph, Richmond, Rockingham, Rowan, Sampson, Vance, Wake, Wayne, and Wilson.

The convention was called to order on Thursday morning, July 9, by Mr. H. B. Varner, president, Lexington, N. C. Rev. E. R. Leyburn made the opening prayer, and the addresses of welcome were as follows:

On behalf of the city of Durham, Mayor W. J. Brogden; for the county, J. T. Rogers, chairman of Board of county commissioners; for the County Good Roads Association, Dr. Arch Cheatham.

Mr. Joseph Hyde Pratt, secretary of the association, reported that since the last meeting of the association in Morehead City some very active work had been done. A special session of the convention had been held at Raleigh just previous to the meeting of the special session of the general assembly; and the legislative committee did some very active work during the general assembly, and would have undoubtedly obtained some good results if other matters than the special one under consideration had been taken up. He also reported that through co-operation with the National Highways Association, with whom the North Carolina Good Roads Association became affiliated at the Morehead meeting, the services of an organizer and road engineer had been secured February 1st, 1914. Mr. D. Tucker Brown, formerly with the Virginia Highway Commission, has filled this position very satisfactorily and has done some very good organization work, as well as giving engineering advice and assistance to counties and townships desiring same.

Mr. Pratt reported that the proceedings of the convention in Morehead City were given in full in Economic Paper No. 36 of the North Carolina Geological and Economic Survey, which also contains a statistical report of the road work done in the state during 1912. Any one desiring this publication can obtain same by writing to the state geologist and enclosing ten cents to cover packing and mailing charges.

Mr. Joseph G. Brown, president of the Citizens' National Bank at Raleigh, made his report as treasurer, which was approved.

Mr. Varner appointed the following committee on resolutions:

Judge A. W. Graham, chairman, Granville county; Hon. James A. Wellons, Johnston county; W. S. Fallis, Vance county; D. Tucker Brown, Orange county; S. H. Webb, Alamance county; W. C. Jones, Guilford county; C. S. Wallace, Carteret county; P. B. Beard,

Rowan county; W. J. Griswold, Durham county; Z. V. Turlington, Iredell county.

A telegram was received from Governor Craig stating that he would be unable to attend the convention.

The next speaker on the program was Mr. D. Tucker Brown, organizer and engineer of the North Carolina Good Roads Association. Mr. Brown spoke very briefly on the objects of the North Carolina Good Roads Association and of the work he has accomplished. One point brought out in Mr. Brown's talk was that in a great many of the counties of the state local associations have been organized, which, however, after accomplishing the immediate local purpose for which they were organized have practically died out. It is the belief of those who have worked for the state association for the past ten years that there is more work to be done by the local associations than simply that of local matters, and that these associations should begin to uphold the hands of the state association not only in memberships, but with regard to the enactment of certain state laws by the general assembly. It is not the purpose of the association or of the survey to forget at any time the county roads leading from the farm sections to the markets; but it is the purpose of the association to foster an interest in a system of national highways, a system of state highways, a system of county highways, and a system of township highways, with each a distinct unit, yet all integral factors of a complete system of "Good Roads Everywhere." It is the lack of system in county, township, and state which has given such poor results from the amount of money expended in North Carolina during the past ten years, and which will continue to give poor results without the employment of competent engineers who can make good locations, good surfacing, and systematic and continual maintenance.

Mr. Pratt gave a talk on North Carolina's Public Road Policy, giving in detail the methods now employed in the raising of funds by bond issues or special taxes, the administration of same, and the general results. He showed that North Carolina is becoming alive to the necessity for good roads and that many of the counties and townships of the state have during the past year voted bonds for roads. But few of these, however, have realized the necessity of a system of organization and the employment of highway engineers capable of properly locating, building and maintaining the roads. The general assembly of 1913 passed 101 special acts for the voting of bonds in 12 counties and 89 townships, and also passed a special act applying to all but four by means of which any townships can vote bonds up to the amount of \$50,000 after first petitioning the county commissioners. This is considered by those who have studied the road problem as an act which has hurt the good roads cause, because the smaller the unit in road work the more the roads cost and the less value they are to the community and the surrounding communities. When a prosperous township votes bonds and attempts to build a system of roads, it pays a higher rate on its bonds and has more difficulty in the sale of them. As a rule it is unable to employ a competent engineer without crippling its funds, so

has to decrease its mileage of good roads which they expected to get; and yet the engineer is the most important part of the road building, for without his services the roads will not be well located and the location is the only permanent part of the road. Then again, if one township in a community is surrounded by other townships with bad roads, it is shut in, as it were, and the tonnage they can haul is regulated by bad roads around them. It has been the policy of the geological survey and the North Carolina Good Roads Association to advise against township bond issues, unless the county as a whole refuses to vote county bonds. Through the acts of the general assembly of 1913 \$3,642,500 have been voted in bonds up to the present time, which added to the bond money voted previous

ride, for an inspection of the Durham county roads, would be given, followed by a Dutch luncheon at Lake-wood Park at 5:30 p. m.

The afternoon session was called to order at 3 p. m. by the president and the first speaker on the program was Mr. Charles P. Light, field secretary of the National Highways Association, who spoke on the meeting of the American road congress which is to be held in Atlanta in November.

The next subject taken up was that of convict labor. Mr. J. S. Mann, superintendent of the State's Central Prison, was unable to be present. Mr. Pratt read from a pamphlet certain recommendations or suggestions of Mr. Mann's which should be carefully considered by all those interested in our convicts and highway work. As is shown in this pamphlet of Mr. Mann's there is a great diversity in the methods of working the county convicts. Mr. Mann says there are anywhere from forty to fifty different methods of looking after county convict camps, and he believes it is the duty of the state to see that the convict camps are properly kept and maintained. Mr. Mann made certain recommendations to the legislature, some of which were incorporated in a bill passed by the general assembly of 1913.

A resolution was introduced by Judge A. W. Graham on the floor of the house as follows:

Resolved, That the general assembly of North Carolina be requested to enact a law to withdraw all able-bodied convicts from work on the state farms and penitentiary as soon as the present crops are gathered and marketed, and to consign them to work on the public highways of the state; and to withdraw all convicts now at work on the railroads and other public work as soon as the present contracts expire, and consign these to work on the public highways; and that hereafter all persons convicted of crime and sentenced to hard labor shall be worked on the public highways.

Resolved, That in the event of the establishment of a State Highway Commission by said general assembly, that said state convicts shall be worked under the direction of the state highway commissioner.

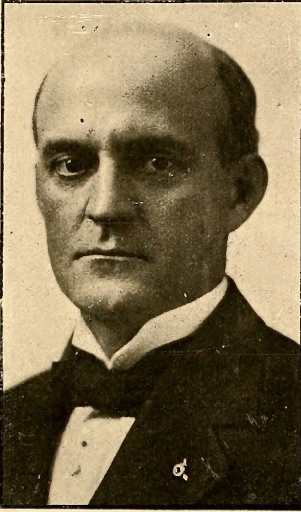
The question of convict labor was then submitted to discussion and Dr. Templeton of Wake spoke at some length.

Mr. T. J. Murphy of Greensboro announced that he would be unable to attend the convention on the next day, and wished to present an invitation from Greensboro to hold the next annual meeting in that city.

A night session was held at 8:30 in the academy of Music, and President Varner introduced the speaker of the occasion as one of the "best good roads orators in the nation." The speaker was Hon. Jesse Taylor, president of the Ohio Good Roads Federation and director general of the National Highways Association.

Mr. Taylor, in spite of the fact that he had been traveling for over 24 hours, spoke in his usual enthusiastic and impressive manner. He is a strong advocate of national aid, and of state aid in the building of good roads which "Begin Somewhere and End Somewhere." He stated the manner of building roads in Ohio and how that state managed to take advantage of an unusually large proportion of the funds voted by congress for road assistance. His earnest wish was that the next general assembly of North Carolina would see to it that the road work of the state is put under the supervision of a highway commission which will help to give us good roads everywhere, resulting in "better homes, better people, more churches and greater respect for God."

The convention was called together on Friday morning, July 10th, by President Varner. He introduced



HON. JESSE TAYLOR
National Organizer National Highways Association

to this and which is yet to be spent makes a total of approximately \$5,424,500; and unless some provision is made for state engineering assistance so that this money will be spent to the best advantage, there will undoubtedly be a large proportion of it wasted, and the good roads cause will receive a setback from which it will be slow to recover. With a highway department, equipped with funds sufficient to employ enough engineers to do the engineering work for the various counties and townships, the road work of the state will begin to be systematically administered, and the best results will follow.

Mr. Pratt's talk provoked considerable discussion from the floor of the house on the subject of a State Highway Commission. Among those who took part in this discussion were Mr. W. A. Erwin, Mr. James A. Wellons, Mr. W. C. Douglas, Mr. W. C. Boren, Col. A. H. Boyden, former Lieutenant-Governor, Mr. W. D. Turner, Judge P. C. Graham, Mr. A. H. Eller, Hon. Frank Nash, Mr. Murphy of Greensboro, and others. The details of these discussions will be given in a fuller report which will be published later.

The remainder of the session was taken up in a discussion of a state highway commission, and the session adjourned for lunch. An announcement was made that at 3 o'clock in the afternoon the work of the convention would be resumed; and at 4 p. m. an automobile

Rev. L. P. Howard who opened the convention with prayer. A telegram was received from Hon. John H. Small, Congressman for the First District, as follows:

"Regret sincerely I cannot attend meeting good roads association. Had made arrangements to attend, but other demands on my time which I cannot ignore. Must return to Washington, D. C. Association has become a potential factor in educating and arousing our people for good roads."

Mr. J. E. Pennybacker, of the United States Office of Public Roads, who was to address the association on road maintenance failed to come, and Mr. D. H. Winslow, representing the office of public roads, spoke in his place.

Mr. Winslow spoke very strongly in favor of the maintenance of our roads after construction. He stated that the American Highways Association this year made a proposition that they would furnish at their own expense automobiles for the use of the government's engineers if the government would furnish experienced men to take charge of the maintenance of the roads of the National Highway from Washington to Atlanta. The government made the proposition that the American Highways Association should secure the consent of 25 per cent of the counties between Washington and Atlanta to co-operate in this proposition. The party received very enthusiastic receptions in the way of barbecues and meals, but few of the county commissions through Tennessee said that they would sign any papers. He said: "There was, however, very little difficulty in North Carolina, and every single county across this state has agreed to the proposition except two miles at Wilson's Mills. Last Monday a citizen of Smithfield offered to pay the cash into my hands to keep up these two miles if Wilson's Mills township did not care to do it." Mr. Winslow went into details as to amounts given by the various counties and townships for the upkeep of this National Highway. His speech will be given in full in the detailed report. There was considerable discussion of Mr. Winslow's paper and many questions asked.

Judge A. W. Graham of Oxford next spoke on the establishment of a State Highway Commission. Judge Graham's paper was discussed in considerable detail, and the proposed bill was read.

Judge Graham then made his report as chairman of the Resolutions Committee as follows:

Resolutions.

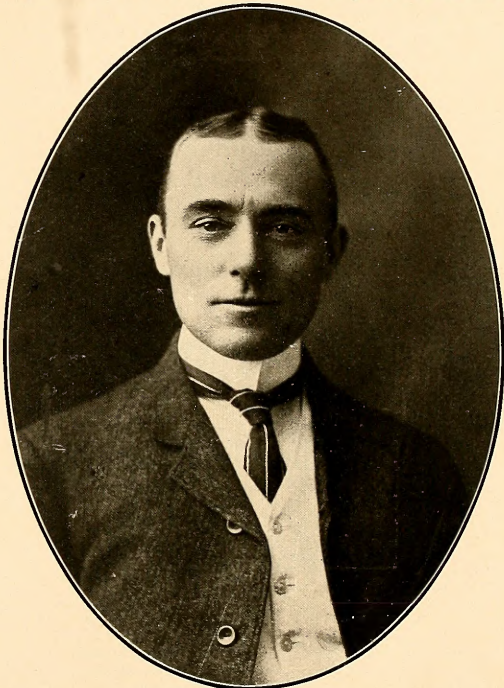
Realizing that the people of North Carolina have voted up to the present time about four million dollars in bonds and special taxes amounting to more than a million and a half dollars annually, to be expended in the construction and maintenance of the public roads of the state; and realizing further that this money is not in every respect being properly expended, due to the lack of a system of state and county road construction and maintenance; therefore

Be it Resolved that the convention of the North Carolina Good Roads Association, assembled in the city of Durham this the tenth day of July, 1914, goes on record as most heartily endorsing the following resolutions:

Resolved, That we herewith assert that the first and prime object of this association is to further the construction of good roads throughout the state giving its greatest energy to the development of work on inter-township and inter-county roads constructed for the purpose of improving the facilities of marketing the farm products of the state and bettering the social relations of the rural population of the state of North Carolina.

Resolved, That we favor the creation and establishment of a State Highway Commission for the state of North Carolina; and we urge the general assembly to establish, equip and maintain the same and to enact such laws as will render such commission of the most effective service possible to the people of the state.

Resolved, That it is the sense of this convention that all state convicts who are suitable for road work should be used in the construction of public roads and that they should be worked under the supervision of the



HON. CHARLES P. LIGHT
Organizer American Highway Association

proper authority and as will insure the greatest benefit to the citizens of the state of North Carolina at large.

Resolved, That it is the sense of this convention that the taxes levied on all motor driven vehicles, regulated according to the horsepower of the passenger car and the carrying capacity of the auto trucks, shall be used and applied to the support of the public roads of the state.

Resolved, That whereas there is a law on the statute books of North Carolina making it obligatory upon the county commissioners to erect sign posts or sign boards at all cross roads in the counties and for the overseers to maintain such sign boards and sign posts, that the judges and solicitors of the districts be requested to see to the enforcement of this law.

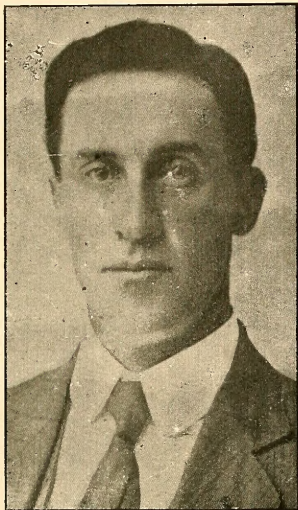
Resolved, That the road officials throughout the state be urged to give more consideration to maintenance of the public roads.

Resolved, That we most heartily endorse federal aid to public and post road construction, and do hereby urge our senators and members of congress to give their earnest and serious consideration to such aid.

Resolved, That this association favors the suggestion of President E. K. Graham of the State University that

the governor be requested to appoint a week or at least several days to be known as "Civic Week" or "Civic Days" during which time all the people of the state shall be called upon to give special consideration to those matters which relate particularly to the betterment and uplift of the communities and that this association pledges its support to make such "Civic Week" or "Civic Days" a successful movement in North Carolina.

Resolved, The we most heartily commend our distinguished Governor Locke Craig, for the interest he has ever displayed in the cause of good roads and the



MR. D. H. WINSLOW
Engineer U. S. Office of Public Roads

efforts he has made to disseminate knowledge and arouse an interest in the same; and we especially commend and endorse his action in setting aside two days in November, 1913, as "Good Roads Days" and in calling upon all good people of this state, regardless of professional calling or place of residence, whether in town or county to assemble and give two days of work in constructing and repairing the public roads of their respective counties. We congratulate him on the results accomplished and assure him of our appreciation of his interest and efforts in the cause; and ask him to again set apart two or more days in the fall of the year for work on the public roads and to urge the people to respond to his call.

Resolved, That we appeal to the people of the state of North Carolina for their hearty co-operation with this association in seeing that the above resolutions are carried out and that we especially appeal to the teachers in our public schools, colleges, university and all school officials to use their best efforts in helping bring about a healthful sentiment for a better road system.

Resolved, That this association greatly appreciates the support heretofore given by the press throughout the state to the good roads movement and requests and desires their continued valuable assistance and co-operation; and be it further

Resolved, That this association appreciates the co-operation of the rural letter carriers association, travellers' protective association, and railways of the state.

Resolved, That the thanks of this association be extended to the city of Durham, Commercial Club, Durham County Good Roads Association for their most cordial hospitality extended to the delegates; and be it further

Resolved, That the sincere thanks of the association be extended to the daily papers of Durham for their full reports of the convention and their assistance in advertising the same.

The next address on the program was delivered by Hon. M. V. Richards, Land and Industrial Agent of the Southern Railway, who spoke in part as follows:

"A recapitulation of what has been accomplished throughout your state in the development of commerce, industry, agriculture, and education under adverse conditions would appear a revelation to many. Patience, sacrifice, and abnormally hard work have brought your state great credit. May the people of North Carolina unite and determine to lead in the construction of public highways; may your enthusiasm not cease until your commonwealth stands at the head of the list."

The convention feels that it was very fortunate in securing Dr. H. Q. Alexander, president of the State Farmers' Union, to speak on this occasion. Dr. Alexander is a progressive in the truest sense. He stated that the cost of bad roads to farmers in the United States is greater than the maintenance of our national government. "The cost of bad roads exceeds the cost of all railroads in the United States." He said, "I want to say to you that in my judgment one of the greatest problems that confronts the people of North Carolina to-day is the problem of building up rural communities, and that boiled down is to keep the best people on the farms. In order to keep the people on the farms you have to have good roads, so the movement which is being carried on by the men that are present here today is one of the principal means of building up the rural districts of North Carolina."

Hon. George S. Powell, secretary of the Appalachian Park Association, appeared before the convention to extend an invitation to the association to hold the next meeting in Asheville. Mr. Powell also presented to the association a resolution in regard to the building of roads through the forest reservations recently purchased by the national government in North Carolina, which was passed.

Delegates from various counties gave in reports in regard to the work now being done in these counties, and some very interesting results were reported.

There was also considerable discussion among the delegates of ways and means of increasing the memberships in the county.

The afternoon session was called to order at 3 by President Varner, who introduced Mr. W. C. Hammer, president of the North Carolina Press Association and also United States District Attorney. Mr. Hammer spoke at length in regard to the road work in his section and in the state generally. He emphasized especially the great need for a State Highway Commission.

The report was then made on the road of the central highway in Carteret county to date.

The Chairman of the Board of Trustees, Mr. Pratt, then announced that the trustees had changed the charter of the North Carolina Good Roads Association, the principal changes being as follows: The establishing of a governing board of the North Carolina Good Roads Association to act as a state council of 33, to be the first ones to be appointed by the present board of trustees. A certain number of these are to be chosen for one year, others for two, three, four, and five years

at each annual convention thereafter. Six of this state council shall be elected by the association at large at the annual meeting, and a certain number be elected at each convention for five years. This council shall elect the fifteen trustees of the association. Another change decided upon is in regard to the dues collected by the North Carolina Good Roads Association. We are federated with the National Highways Association, and our board of trustees have voted unanimously that we turn over to the National Highways Association 35 per cent of the money collected by the North Carolina Good Roads Association; and in turn the National Highways Association pays the salary of the North Carolina organizer or state director.

The officers elected for the coming year are as follows:

H. B. Varner, President, Lexington; Joseph Hyde Pratt, Chapel Hill, Secretary; Miss H. M. Berry, Chapel Hill, Assistant Secretary; Jos. G. Brown, Raleigh, Treasurer; D. Tucker Brown, Chapel Hill, Director.

Vice-Presidents—Bennahan Cameron, Durham, N. C.; R. A. Doughton, Sparta, N. C.; E. L. Daughtridge, Rocky Mount, N. C.; Fred Dutton, Kinston, N. C.; A. H. Eller, Winston-Salem, N. C.; M. T. Young, Dunn, N. C.; A. W. Graham, Oxford, N. C.; J. S. Martin, Chadbourne, N. C.; John Morehead, Charlotte, N. C.; F. P. Tate, Morganton, N. C.

Executive Committee—H. B. Varner, Lexington, N. C.; Joseph Hyde Pratt, Chapel Hill, N. C.; Chas. Wallace, Morehead City, N. C.; D. A. McDonald, Carthage, N. C.; R. R. Cotten, Bruce, N. C.; J. E. Cameron, Kinston, N. C.; W. C. Hammer, Asheboro, N. C.

Legislative Committee—John C. Drewry, chairman, Wake county; R. T. Grant, Davie; A. H. Boyden, Rowan; A. Cheatham, Durham; W. C. Hammer, Randolph; D. A. McDonald, Moore; James A. Wellons, Johnston; A. W. Graham, Granville; R. R. Cotten, Pitt; W. D. MacMillan, New Hanover; Chas. Wallace, Carteret; F. Stikeleather, Buncombe; P. H. Hanes, Forsyth; W. C. Jones, High Point, N. C.; W. L. London, Pittsboro, N. C.; G. E. French, Statesville, N. C.; P. B. Beard, Salisbury, N. C.

Mr. Pratt then read a number of telegrams from the city of Asheville extending a most cordial invitation for the next meeting of the association to be held in that city. A motion was made that the invitations for the next meeting be referred to the executive committee.

Mr. James A. Wellons then reported on the central highway in Johnston county.

As a number of the delegates had to leave on the afternoon train Mr. Pratt, chairman of the committee on awards, announced that Granville, with 62 points, had received the gold eagle for the largest percentage of delegates attending in relation to the distance from which they came. The silver eagle, or the second award, was given to Buncombe county, which had 60 points. The first award for the best exhibit of photographs illustrating county work was given to Vance county, and the second to Henderson county. The county with the largest number of paid-up members in the association was Person county.

There seemed to have been some misunderstanding in regard to the awards for best exhibits of photographs, maps, etc., which was explained by Mr. Pratt.

The reports on the Central Highway were then continued and Mr. Varner read a statement in regard to the work on the Central Highway in Davidson county, which was followed by reports from Mr. J. M. Templeton, of Wake county, Dr. A. Cheatham of Durham county, and Mr. S. H. Webb, of Alamance county.

Mr. A. B. Skelding reported for the Charlotte-Wil-

lington Highway, and Mr. W. D. MacMillan for the Wilmington-Goldsboro Highway.

Dr. A. Cheatham made a brief statement in regard to the Durham-Sanford Highway, and Col. Bennahan Cameron spoke on the International Highway, or what is generally known as the Quebec-Miami Highway.

The convention was well attended and a great deal of interest was shown particularly in the establishment of a State Highway Commission by the next general assembly. The idea was advanced that this could best be done if every member of the North Carolina Good Roads Association would do his part towards bringing the matter before his representative in the general assembly in such a way as to make him realize the tremendous immediate import of such legislation to our state. A complete stenographic report of the convention will be published as an economic paper by the North Carolina geological and economic survey in co-operation with the North Carolina Good Roads Association.

Each convention of the North Carolina Good Roads association emphasizes more and more the great need of a State Highway Commission to bring about more systematic and better methods of road building and maintenance, and the necessity for having continuous good roads rather than intermittent stretches of good and bad roads.

Prizes for Highway Study.

Awards have been made in the competition announced several months ago by the Barber Asphalt Paving Company, for papers from engineering students on the subject of asphaltic materials for highway construction. The judges of the competition, E. J. Mehren, editor Engineering Record, and H. P. Gillette, editor Engineering and Contracting, have made awards of prizes of \$100 each to the following contestants:

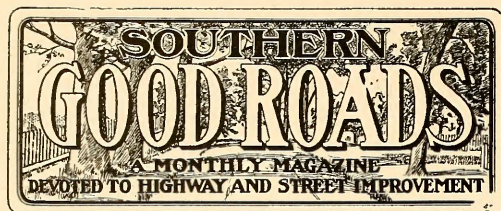
Frederic O. X. McLoughlin, New York City, Columbia University; Harry Schindler, Brooklyn, N. Y., Cornell University; B. J. Fletcher, Parrott, Ga., University of Georgia; John W. Hill, Chicago, Ill., University of Illinois; Robert S. Johnston, Ireton, Iowa, Iowa State College; M. V. Holmes, Kansas City, Kans., University of Kansas; F. P. Gilbert, Beverly, Mass., Massachusetts "Tech."; Harold J. LaLonde, Sault St. Marie, Mich., University of Michigan; Benjamin Wilk, Virginia, Minn., University of Minnesota; Alvin C. Smith, Lyons, Neb., University of Nebraska; O. H. Gosswein, St. Louis Mo., Purdue University; Alfred A. Berkowitz, New Britain, Conn., Sheffield Scientific School; W. J. Campbell, Cohoes, N. Y., Syracuse University.

The purpose of the competition was to turn the attention of engineering students to street and road construction as a promising field of work. The company offering the prizes believes that the plan was successful in this direction.

The Owensboro Ditcher and Grader Company Enlarges.

The Owensboro Ditcher and Grader Company, of Owensboro, Ky., has been incorporated with a capital stock of \$250,000. The company has recently made decided improvements in their ditcher and grader. It is now all steel and so constructed that it turns out more work and is more durable than the old grader. New quarters have been acquired and the company will largely increase its output. They are finding no trouble in disposing of their machines.

An optimist was never known to oppose road or street improvement.



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Official Organ of the North Carolina Good Roads Association

HENRY B. VARNER, President, Lexington, N. C.
 DR. JOSEPH HYDE PRATT, Secretary, Chapel Hill, N. C.

Official Organ Southern Appalachian Good Roads Association

DR. JOSEPH HYDE PRATT, President, Chapel Hill, N. C.
 HENRY B. VARNER, Secretary, Lexington, N. C.

Official Organ of the South Carolina Good Roads Association

F. H. HYATT, President, Columbia, S. C.
 FINGAL C. BLACK, Secretary, Columbia, S. C.

Official Organ of the Virginia Road Builders' Association

W. F. COCKE, President, Richmond, Va.
 F. D. HENLEY, JR., Secretary, Richmond, Va.

VOL. X. AUGUST, 1914. NO. 2.

ALABAMA.

We are devoting a great deal of space in this issue to Alabama, the state in which the "State good roads day" idea had its birth. If Alabama had no other claim to good roads fame, that one achievement alone would be more than sufficient to place that great state well up with the leaders in the good roads movement. Since Alabama started the ball rolling good roads days have been celebrated in all parts of the nation and a wonderful amount of good has been accomplished.

In Governor O'Neal Alabama has a real "good roads governor." He went into office, pledged to do something for road improvement and determined to carry out his promises to the people. He has succeeded admirably. The state highway commission plan, advocated by him, was adopted early in his term and Alabama now has a highway commission and a system of state aid unsurpassed by any southern state.

In this issue Governor O'Neal tells of his good roads hopes and aspirations for his state. He would have the Alabama legislature map out a system of trunk highways, running north and south, east and west, covering the entire state, and direct all of the state's energies toward the building of those trunk lines. He

stands for roads that "begin somewhere and end somewhere" and is very much opposed to a patchwork system that "begins nowhere and ends nowhere."

The good roads leaven is working in all parts of Alabama. You can hardly pick up an Alabama paper, daily or weekly, that does not record one or more achievements for the cause of good roads. The counties are taking advantage of state aid and there is good roads interest and enthusiasm everywhere.

In this issue also appears Governor O'Neal's good roads days proclamation, in which he again calls all loyal, patriotic Alabama to join hands and work the roads of the state on August 13, 14 and 15. That there will be immediate and hearty response from all classes of Alabama citizenship is practically certain.

AYCOCK ON GOOD ROADS.

When the North Carolina Good Roads Association was organized in 1902 the late Governor Charles Brantly Aycock made a speech that is remembered to this day by the men who heard him. In words that burned into the consciousness of his hearers and that stung the pride of patriotic Tar Heels in all parts of the state, he urged those who were already active in the good roads cause to greater activity and he aroused the sleeping to such an extent that wonderful good roads development resulted. He began his speech with this statement:

"The great strength of North Carolina has been its love of individual liberty, its devotion to the state. Its weakness has been its isolation."

No man that has ever appeared in the public life of North Carolina could come closer to hitting the mark than Governor Aycock and no other citizen's words carried such weight as his. When he criticised, the people sat up and listened, for he was no idle critic. He loved North Carolina too well to criticise where criticism was not absolutely necessary and the people knew it.

Listen further to the words of Governor Aycock:

"The question of good roads touches us at every point. It measures the attendance at school. We can calculate from the condition of the roads the number who go to church on Sunday; it touches our agricultural life; it meets us in industry and commerce; there is no interest in North Carolina which is not touched by it."

The work is going on in the Old North State. Steadily, day by day, the good roads idea gains ground and county after county falls into line. By and by a legislature will assemble down at Raleigh that will establish a great state highway commission, with an adequate appropriation to carry on its work, and there will be trained engineers ready to direct road work in any county in the state. Some of these days Governor Aycock's dream is going to come true and it is a pity that he couldn't live to see it and rejoice with us.

GOING AT IT RIGHT.

Southern Good Roads heartily approves of the plans now being worked out by the American Highway As-

sociation, the American Automobile Association and the American Bar Association, looking to the preparation of a simplified, efficient code of road laws. An exact compilation of the road laws of every state in the union is now nearing completion and this will form the basis on which special committees from the three organizations named, composed of men recognized as authorities on road legislation, will work. The plan which those men work out will be presented at the Fourth American Road Congress in Atlanta during the week of November 9. If this great body of road experts and enthusiasts approve it, the matter will be taken up with the governors of all the states and through them presented to the legislatures of all the states at their next sessions.

The idea is a good one. It will place at the disposal of all of the states, the best road laws of the nation and will serve to lessen the number of costly mistakes in road legislation. Many a piece of road legislation has been placed on the statute books that should never have been placed there and nearly all of them were enacted not because the legislators were not doing their best for their constituents, but because they did not know the best thing to do.

With the latest and best road legislation, representing the combined wisdom of the road experts of every state in the union, ready at hand, it will not be difficult to get results in any legislature in the land. The idea is a good one and we are glad to know that the three great organizations above-named are interested in it.

COMING CONVENTIONS.

Southern Appalachian Good Roads Association, Bristol, Va.-Tenn., October 6, 7, 8 and 9, 1914. H. B. Varner, Lexington, N. C., secretary.

American Highway Association and American Automobile Association-Fourth American Road Congress, Atlanta, Ga., Nov. 9-13, 1914. I. S. Pennybacker, executive secretary, Washington, D. C.

American Road Builders' Association—Fifth Road Congress—Eleventh annual session, Chicago, Ill., Dec. 14-17, 1914, 1914. E. L. Powers, New York City, Secretary.

Alabama Good Roads Association—Eighteenth Annual Session, Montgomery, Ala., Oct. 21-23. Secretary, J. A. Rountree, 1021 Brown-Marx Bldg., Birmingham, Ala.

Texas Good Roads Association—Mid-summer convention—Galveston, Tex., August 17, 18, 19. Homer D. Wade, Secretary, Stamford, Tex.

To Standardize Road Construction in Arkansas.

A committee of the Arkansas Society of Civil Engineers, consisting of W. J. Parks, Pine Bluff; Phil Hill and W. D. Dickinson of Little Rock, conferred with State Highway Engineer Hugh R. Carter, July 27, relative to standardizing road construction work in the state.

Engineer Carter has been busy for several months preparing specifications for permanent road improvement construction which would meet with the approval of civil engineers throughout the state. The committee which met with him represented the Arkansas Society of Civil Engineers and has authority from

that body to agree to specifications which they feel will be standard for the state.

The Probable Basis of Federal Aid

By GEORGE C. DIEHL

Chairman National Road Board A. A. A.

The basis of apportionment of federal appropriations to the respective states is a matter upon which there is very little disagreement, and it is probable that population, area, and post road mileage will be the factors finally adopted for determining the proportion of federal money to which each state will be entitled.

Finally, our solons will probably begin the program of federal aid with a modest appropriation, probably not to exceed \$5,000,000. This sum, together with an equal amount to be provided by the states, will involve an expenditure of \$10,000,000 during the first year's operation. To start with a modest appropriation and increase it as conditions warrant would be to insure the success of the policy from the outset.

The question which has threatened to become the rock upon which the federal aid good road forces would split is that of federal inspection. There are legislators who stand aghast at the possibility of another great federal bureau growing to such proportions as to cast its shadow upon local autonomy. They profess to see the crumbling of "state's rights," the stifling of local initiative and endeavor, and the growth of a political machine. If federal inspection involved these consequences, it would be a dangerous and highly undesirable policy. As a matter of fact, federal inspection, under reasonable legislative restriction, involves no menace whatever to local liberties.

The weight of precedent, and the common sense of congress are sufficiently powerful to make certain the inclusion in any federal aid bill that may be passed of an adequate amount of government supervision.

Federal revenues come from all of the states, and the right of a state to do as it pleases with its own property does not carry with it the right to do what it pleases with property that comes from all of the states. To say that federal inspection of work for which the federal government pays a portion of the cost is either unwarranted or unwise, is to say that the federal government should from year to year make appropriations for specific purposes, and yet take no steps whatever to ascertain whether the money is applied to such purposes.

The contention that federal aid under a plan of federal inspection will stifle local self-help, is not borne out by experiences in the respective states where an analogous plan has been in effect for some years between states and counties. In 1904 the total expenditure on public roads throughout the United States amounted to \$80,000,000. In 1913 the total expenditure aggregated about \$206,000,000, and this in spite of the fact that state participation in road work has had its spirit of greatest development since 1904, and that the total expenditure of state funds up to and including the year 1913 amounted to about \$155,000,000.

The commissioners of Sevier county, Tenn., let a contract to the Luten Bridge Co., of Nashville, Tenn., last month for two concrete bridges to cost \$4,497.

Ministers of the gospel need have no misgivings about preaching good roads from the pulpit. Just as certain as there is a straight and narrow road that leads to heaven, the question of improved roads means a better world on this earth.

OFFICERS

Wm. F. Cocke, President
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C. L. Scott, Jr., V-Pres.
Waynesboro, Va.
F. D. Henley, Secretary
Richmond, Va.
C. S. Mullen, Treasurer
Petersburg, Va.

Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

EXECUTIVE COMMITTEE

Hon. G. P. Coleman
Richmond, Va.
Maj. E. H. Gibson
Culpepper, Va.
B. W. Hubbard
Forest Depot, Va.
C. B. Scott
Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary



ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

That an improved road will increase vastly the productiveness of the area through which it runs has now been satisfactorily demonstrated by studies conducted by the United States Department of Agriculture in Virginia. Conditions in Spotsylvania county were investigated with particular care, and the results have proved surprising.

In 1909 the county voted \$100,000 to improve forty miles of roads. Two years after the completion of this work the railroad took away in twelve months from Fredericksburg, the county seat, 71,000 tons of agricultural and forest products hauled over the highways to that town. Before the improvement of the roads this total was only 49,000 tons annually; in other words, the quantity of the county's produce had risen more than 45 per cent.

Still more interesting, however, is the increase shown in the quantity of the dairy products. In 1909 these amounted to 114,815 pounds, in 1911 to 273,028 pounds, an increase of practically 140 per cent. in two years. In the same time shipments of wheat had increased 59 per cent. tobacco 31 per cent. and lumber and other forest products 48 per cent.

In addition to this increase in quantity, the cost of hauling each ton of produce was materially reduced. In other words, the farmers not only produce more, but produce more cheaply, for the cost of transportation to market is of course an important factor in the cost of production. From this point of view it is estimated that the \$100,000 spent in improving the roads in Spotsylvania county saved the farmers of that county \$41,000 a year.

In the past two years the traffic studies of the federal experts show that approximately an average of 65,000 tons of outgoing products were hauled over the improved roads in the county an average distance of eight miles, or a total of 520,000 "ton-miles." Before the roads were improved it was estimated that the average cost of hauling was 20 cents a "ton-mile;" after the improvement this fell to 12 cents a "ton-mile," or a saving of 8 cents. A saving of 8 cents per mile on 520,000 "ton-miles" is \$41,000 a year. The county's investment of \$100,000 in other words returns a dividend of 40 per cent. annually.

Because this saving, in cases of this character, does not take the form of cash put directly into the farmers' pockets, there is a widespread tendency to believe that it is fictitious profit, while as a matter of fact it is just as real a source of profit as the increase in the price of wheat.

In Dinwiddie county, Virginia, for example, where peanuts are one of the staple crops, the average load

for two mules on a main road was about 1,000 pounds before the road was improved. After its improvement the average load was found to be 2,000 pounds, and the time consumed in hauling the larger load to market was much reduced. In other words, one man with a wagon and two mules could do more than twice as much work with the improved road than with an unimproved road. This is the explanation of the extraordinary rise in the total output of agricultural products in a county with a good road system.

* * *

Virginia Road Builders Association Notes.

The Virginia Road Builders Association has up to this time been composed principally of engineers, contractors and county officials, that is persons whose business it was to make a study of road building and maintenance.

It is desired that as many of the general public as possible, throughout the state, become members of this association.

Nearly every citizen is interested in the improvement and maintenance of some particular road, and an intelligent interest on the part of the citizens of each community can not but help toward a better return for the money spent for road purposes.

The addresses and discussions before the meetings of the association are confined to the practical subjects of road construction and maintenance, as it is assumed by the association that no intelligent person will at this day and time deny the advantage of improved roads.

It is, therefore, the object of the association to discuss the best methods to be used in building and maintaining all classes of roads and at the meetings it is desired to draw out suggestions from its members as well as to gather new ideas and instructions from the addresses of the experts of high standing from other states.

The Eastern Carolina Highway Association will be organized at a meeting to be held soon at the Isle of Palms, Charleston, S. C., by good roads enthusiasts from the Pee Dee section of the state. This announcement was made recently by Commissioner of Agriculture Watson. Mr. Watson held a conference in Charleston with Reid Whitford, engineer, when the association was discussed. The object of the association is to improve the highway between Cheraw and Charleston and the branch roads. This road would give Charleston a new connection with the Capital-to-Capital highway.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Arkansas.

The proposed Little Rock-Fort Smith highway, the biggest piece of good road improvement yet undertaken in Arkansas, cannot be built without an entirely new good roads law, according to W. B. Owens, secretary of the Arkansas Highway Commission, who with H. K. Carter, the state highway engineer, and members of the highway board, has just completed making a log of the pike. The present law contains too many loopholes and weak points for technicalities and delays, according to Secretary Owens, and as soon as the assembly meets they will be asked to remedy the defects. Prior to that time the commission expects to complete all arrangements for building the road. As soon as the log is prepared, the estimated cost of improvement will be made and meetings in the interest of the project will be held along the route. The commission definitely decided that two western outlets were necessary, one north of the Arkansas river from Russellville to Fort Smith via Ozark and the other south of the river from Dardanelle to Fort Smith via Paris and Charles.

* * *

Florida.

A meeting of the board of governors of the Polk County, Fla., Good Roads Association was held at Bartow, in the rooms of the Bartow Board of Trade July 27, at which John S. Howard, president; D. M. Pipkin, W. H. Lewis, F. E. Ohlinger, E. E. Cline were present and C. H. Walker, represented by George W. Oliver, and C. C. Farmer by R. J. Hutchinson.

The organization was hatched by the election of a vice-president and a secretary and treasurer, a motion having been carried to consolidate the last two positions. E. E. Cline was unanimously elected vice-president and A. J. Holworthy was unanimously elected secretary and treasurer and instructed to notify all members that he was now ready to receive dues.

* * *

Mississippi.

The Mississippi State Highway Association, with the Octibahha Hill Climbers met at Booneville on July 29. Nearly all the eastern counties from Meridian to Corinth were represented with official delegates, besides a large and enthusiastic crowd of visitors.

Hon. D. W. Robins, president of the association, had charge of the meeting, and J. E. Evans not only represented Monroe county but acted as secretary also. Harry Roebka of Rienzi made a strong short talk in favor of good roads.

J. B. Sanders represented Prentiss county. He stated that the First Supervisors' District had spent \$100,000 on building good roads and that the Third District has voted \$75,000 bonds for further extending the roads. The road, as it stands now, is more than two-thirds across the county.

At this juncture one of the delegates arose and said that in his county, where they had no good roads, they were almost trying to give away the same land that in Prentiss county and others, where they had the good roads, was selling for \$50 to \$75 an acre. Lee, Monroe and Lauderdale were the banner counties in the work, these roads being ready to connect with adjoining coun-

ties. Chickasaw lacks only three miles of having her road ready to connect also.

Hon. J. Q. Robins made a telling speech, showing the various advantages of good roads, especially emphasizing the fact of its being a strong factor in keeping the young men and boys on the farm and the development of good citizens. Mr. Parker, president of the board of supervisors of Lee county, in a short, practical talk made the hit of the day, bringing facts and figures to prove the benefits derived from good roads, mentioning churches, schools and markets.

Short talks were made by James S. Rowe of Chickasaw county, G. O'Die Daniels and J. C. Herbert of the A. & M. College, Leonard Rinehart of Booneville and Messrs. Ellis, Miller and Moore, supervisors of Prentiss county.

Hon. Julius E. Berry, mayor, in behalf of Booneville and Prentiss county, welcomed the visitors. Music, furnished by the Booneville Cornet Band, was enjoyed by the crowd.

* * *

Missouri.

The largest sociability tour in the history of Missouri's good roads movement was held in Linn county, July 29, when 175 automobiles, with 900 people, traveled 117 miles and visited every town in the county. The motorists assembled at Brookfield, started on the trip at 8 a. m., ate dinner at Linneus, the county seat, took supper at Marcelina and disbanded at Brookfield at 7 o'clock p. m.

State Highway Commissioner F. W. Buffum, President C. A. Adams of the Hannibal-St. Joseph Cross-State Highway Association and President W. S. Webb of the Kansas City Automobile Club traveled as guests in one of the official cars. The whole affair was a celebration of the fact that Linn county has forged to the front as a leader among the counties of Missouri in the good roads movement. The speeches of the day, therefore, resolved themselves into a series of congratulatory addresses, in which the speakers commended the splendid condition of the county's highways.

* * *

Michigan.

Work on the extension of the concrete roads in Wayne county, Michigan, is in full swing, with 500 men at work grading, rolling and surfacing the main roads outside of Detroit. Bonds to the value of \$334,000 are to be sold before summer to provide the additional funds to carry on the work in the scope that has now been planned. At present there are eighty miles of concrete roads in Wayne county, and the road commissioners plan to extend the system materially. The first of the roads was built in 1909, and, according to experts connected with the United States office of public roads and the Michigan state highway department, it shows not a quarter of an inch of wear. This is in spite of the fact that the methods of construction then used were inferior to those of the present day, and that the road carries a daily traffic of about 2000 vehicles, including 1400 touring cars, 249 runabouts, eighty-five trucks and 145 double-horse teams. The average cost of Wayne county's concrete roads has been about \$1.60 a square yard, while some have been built for as low

as \$1.04 a square yard. Brick, asphalt and wood block pavements have been costing Detroit from \$2.75 to \$3.75 a yard and up.

* * *

New York.

The New York state commission on prison reform, which was appointed by the governor a year ago, has just filed the preliminary report of its findings.

The commission, of which Thomas Mott Osborne (chairman of the national committee on prison labor), is chairman, and George W. Kirchwey, Miss Mary Garret Hay, George W. Perkins and E. Stagg Whitin, members, was authorized to examine and investigate the management and affairs of the several state prisons and reformatories, the prison industries, employment of convict labor, and all subjects relating to the proper maintenance and control of the state prisons of the state. The commission has made careful study of these several matters, and the report which has been released contains many interesting and valuable suggestions.

The commission places itself on record as favoring the employment of able-bodied male convicts in constructing and repairing the highways of the state and the several counties, in addition to which farms should be developed at all of the institutions so that as many convicts as possible may be employed in the open air—all possible work to be conducted under the so-called honor system, together with a considerable and increasing measure of self-government.

* * *

Ohio.

According to the estimate of State Highway Commissioner James M. Marker, \$15,000,000 will be spent for good roads in Ohio this year. Of this sum, \$9,000,000,000 will be spent on contracts under the supervision of the state highway department. The remaining \$6,000,000 will be spent directly by counties and townships.

By July 1st it was expected that the total mileage of road construction contracted for by the state department would reach 309.90 miles, the total cost of which will be \$4,200,000. Macadam will be the construction material for 138.22 miles of improved roadway, brick for 93.34 miles, and concrete for 88.34 miles.

"From now on the state will be letting contracts for the construction of highways at the rate of a million dollars or more at each letting," said Highway Commissioner Marker recently, after ordering advertisements for bids for various highway projects, the estimates on which aggregate nearly \$1,000,000.

The total amount of road contracts let for the month of June was approximately \$1,750,000.

The June contracts call for construction of fifty different improved highways in 29 of the 88 counties of the state. The largest single contract was that calling for the paving of 16.62 miles of the old national pike with brick in Belmont county, the estimated cost being \$403,000.

* * *

Pennsylvania.

It is announced that the Pennsylvania State Highway Department is preparing to begin repair work at once on the state highways of the commonwealth. The decision of the Dauphin county court, handed down last month releases for this purpose \$1,028,665, which is the accumulated money derived from the taxation of automobiles and licensing of drivers during the current year. This vast amount of money has been withheld from the State Highway Department by the action of the auditor general and the state treasurer, who have sought judicial interpretation of the act of July

7, 1913, under which all such sums are appropriated to the uses of the state highway department.

State Highway Commissioner Bigelow, who naturally is gratified at the decision of the court, says the money will be used for the purpose of putting in first class condition all of the state highways of the commonwealth. He points out that the State Highway Department possessed machinery, material and a force of workers necessary to begin operations at a moment's notice throughout the entire state.

Commissioner Bigelow intends to have the state highways gone over thoroughly, broken places repaired, gutters cleaned out, drains and culverts fixed and the roadway scraped, cleaned and put in tip-top condition. Necessarily it will not be possible to enter on new construction to any great extent since the amount of money available will barely suffice for the purposes outlined above on the 9,000 miles of state highways in the commonwealth.

* * *

Texas.

When the new Texas legislature convenes after James E. Ferguson becomes governor, one of the matters for legislative consideration will be a bill for creation of a highway commission to direct the work of road improvements in Texas. John W. Warren, president of the Texas Good Roads Association, said recently that efforts would be made to have such a bill enacted into law.

"I do not know the position of Mr. Ferguson on the good roads question," said Mr. Warren, "but I am inclined to believe he is in favor of anything that will benefit the state. Operation of a state highway commission would be of inestimable value for the upbuilding of a highway system in Texas. The worth of highway commission is well shown by the results being accomplished in thirty-six other states. There is no reason why Texas should lag behind."

At the last session of the legislature a bill for creation of a highway commission was introduced and passed both houses only to be vetoed by Governor Colquitt. He did not approve of the manner in which members of the commission were to be chosen.

The Austin Statesman notes the presence in the Texas capital of Mr. B. F. Heidel, engineer representing the U. S. Office of Public Roads, who was there to confer with Governor Colquitt relative to the building of a post-road between Austin and San Antonio.

Mr. Heidel expressed the opinion that the road will have been completed by next January. Governor Colquitt expressed the wish that the road be completed before the end of his administration.

Mr. Heidel in addition to discussing the road with the Governor, went to Austin for the purpose of signing up a definite agreement with the county commissioners court touching the control of the proposed highway, the character of construction, the manner of payment of the county's share of the cost, etc. The document was duly signed.

Mr. Heidel proceeded on a similar mission to Hays, Comal and Bexar counties and the engineers are now ready to proceed with their profiles, estimates and specifications.

The statement is made that an engineer will go to Comal county first for the purpose; to Hays county the week following; to Travis the next week; and finally to Bexar county, late this month.

After these estimates are made up and submitted to the proper government authorities bids for construction will be advertised for. It is the intention that the contracts shall be let in the several counties separate-

Road Culverts and Siphons

By JAMES WHARTON JONES

THERE ARE three essentials which go to make the ideal culverts: Strength, Convenience, Permanence; and a form of construction which gives one of these is sometimes lacking in the others.

Strength.

A culvert must be strong enough to support the dead weight of deep fills, as well as to sustain the shocks and vibrations incident to heavy and rapidly moving traffic. The need for better roads is generally conceded, and projects for highway improvement are receiving popular support in all sections. The development of great irrigation projects nearly always involves the building of permanent roads. A good road must be perfectly drained. The most direct routes must be followed, and it is demanded that such natural obstacles as exist to make this difficult be overcome in the interest of more economical transportation. Road construction should conform to twentieth century conditions, and where heavy grades existed, cuts and fills must be made. Culverts placed beneath deep fills must be not only of sufficient strength to support them, but should possess a flexibility which will permit of their conforming to uncertain or shifting foundations.

Water courses previously accommodated by open swales or gutters must be so handled as to maintain a level or unbroken highway; the old time bumps and "thank-you-marms" are no longer tolerated. The culvert provided here must be one, not only giving the maximum of strength in proportion to the amount of material employed in its construction, but must possess also a degree of resiliency which will enable it to endure when subjected to the blows and crushing stress of swiftly moving auto trucks and other vehicles, even if protected by a minimum of covering.

Corrugated iron culverts possess all these requirements. Iron sheets when corrugated become immensely rigid, and when formed into a circular shape, the increase of strength over that of plain sheets is enormous. In correct corrugated iron culvert construction, large rivets, closely spaced, are used, and each sheet is interlocked one full corrugation at the joints. The joints being double thickness, are therefore the strongest points in the pipe.

Convenience.

The installation of culverts is at best no easy task. locations are often remote from rail points, and the delivery of materials becomes of much importance. Freight charges on certain forms of construction form a very considerable part of their ultimate cost. Hauling, handling and assembling of materials all help to run this cost up to a prohibitive point. Failure on the part of shippers to include all parts, not to mention damages or breakage en route, often prevent the ready execution of well laid plans, causing expensive and annoying delays.

The ideal culverts are those which can be cheaply

and easily transported and handled; those which are complete within themselves and require the least amount of skill to place in position for service. Since corrugated pipe possesses all these advantages, it is not to be wondered at that it has achieved a considerable popularity with the builders of highways and railroads.

This material is also especially well adapted for use in the form of inverted siphons. It is a curious fact that a corrugated pipe is easier to keep free from mud and other obstructions than one made of smooth metal or masonry. The necessity for these depressed crossings arises very frequently in the irrigated regions, where it is very often the case that highway drainage must be carried underneath a canal or lateral or vice versa.

Permanence.

While the first essential requirement in culvert construction is strength, closely followed by need for convenience in handling and placing, the final requisite is that culverts shall be lasting. In considering this feature it should be borne in mind that other factors than the mere disintegration of materials often have to do with the life of a culvert. There are precious few culverts in existence, which have served for a period of fifteen years. Wooden structures warp and either wear or rot out in a brief space of time, and their further use in culvert construction is almost universally discredited. Brittle materials crack and collapse with resulting expense of renewal or replacement. Breakage may result from shocks of travel or shifting foundation resulting from settling of earth or washouts. The action of alkali soil, frost and other conditions is often such as to ruin in a short period, construction which was originally intended to last for all time.

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**BEST BLOOM Galvanized Sheets
FOR CULVERTS**

C. B. KEYSTONE GRADE
Are Specially Adapted

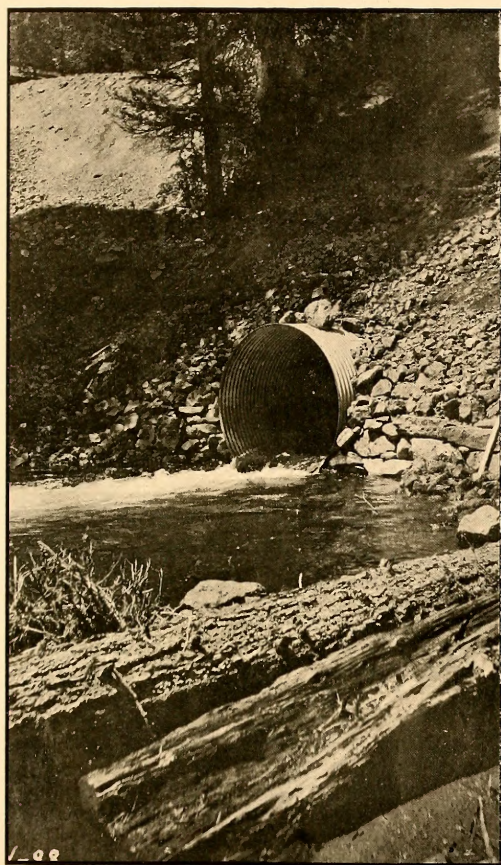
TANKS, FLUMES, Etc.
Strong, Rigid, Lasting

Irrespective of the design of Culvert you may select, demand that the material used be APOLLO BEST BLOOM Galvanized Sheets—C. B. Keystone Grade, thereby insuring maximum service. Also unexcelled for Roofing, Siding, and exposed sheet metal work.

AMERICAN SHEET AND TIN PLATE COMPANY, Frick Building, Pittsburgh, Pa.



Change of drainage frequently makes the removal of a culvert necessary in order that provision for increased flow may be made, and to accomplish this, the original culvert, if not removable, must be destroyed. If a change of route occurs, such culverts as are built in place from materials which cannot be shifted, rep-



A Pure Iron Corrugated Pipe, 7 Feet in Diameter, and 112 Feet Long, 12 Gauge Material, installed under a 32-foot fill in 1912.

resent a total loss for further service, and the permanence originally hoped for, does not exist.

High-purity iron corrugated culverts represent a very permanent type of culvert construction. When built from the proper gauges, they are not harmed by heavy or shallow fills, and because of their flexibility, will not crack or break down as a result of shifting foundations. They do not wash out because the earth in which they are placed packs into their corrugations, and prevents the beginning of trickling streams of water along their sides.

They are removable at will, and can be used again and again. Their permanence is therefore wholly dependent on the life of the material from which they are made.

It is generally conceded that iron or steel rusts in proportion to the amount of impurities present. Iron produced by the painstaking and laborious methods of



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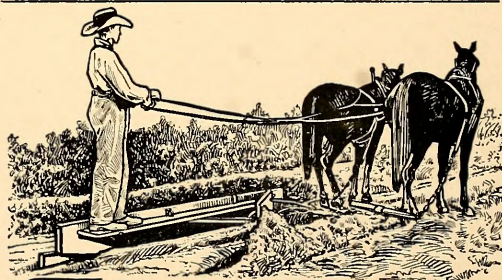


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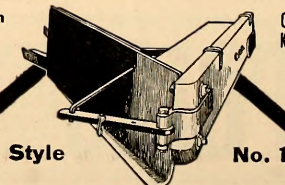
At Bigger Profit to Road Makers

This shows the Martin Road Grader and Ditcher doing with one man and one team, the work of the big, clumsy machine that requires two to three men and six to ten horses. Big money saver. Fool proof. Works where the big ones can't. Many times cheaper. Sent 10 days' trial. Money back guarantee. Write for free book, prices, etc. It will be a revelation to you in every way.

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Style

No. 1

long ago has endured through many years of trying exposure. The links used in the construction of the Newburyport (Mass.) bridge in 1792 are to-day in an almost perfect state of preservation. The reason for this appears when an analysis of these old links shows them to have been made from remarkably pure iron.

Dating from the introduction of the Bessemer process of steel making, tonnage produced at the expense of quality covered the country with structures which have quickly rusted out when exposed to the elements. Analyses show that modern steel is high in impurities. When the United States government by its investigations established the fact that the rapid corrosion of iron or steel was caused by the impurities present, it remained for some one to devise a method for their elimination.

This problem has enlisted the service of some of the best minds in the iron and steel industry, with the result that it is now possible to procure in the open market material of a very high standard. Corrugated culverts have been rendered practically useful by the employment of pure iron. The rigid enforcement of specifications calling for the best which is practically obtainable will result in lasting installations of exposed iron work.

Seeking Untrod Highways.

Motorists are seeking to avoid the "beaten paths" in their pleasure jaunts more than ever before. So firmly has the motoring bug inoculated the American people that we continually desire "new roads to conquer." In this connection I have a new suggestion to offer those who are tired of commonplace tours."

Write the government geological survey for copies of their carefully prepared maps of the country through which to you wish to travel. Or if you have no preference ask for that of your own state. Careful study of these maps, which, by the way, have every pond, lane, brook and farm house indicated thereon, will show you plenty of places full of natural scenery and the maps are so drawn that you are able to choose the most quaint, out of the way places easily.

Take your family or party and start out, with fixings for the eats right with you, that's part of the fun, and, if you are in an especially nomadic frame of mind include the tent and camp alongside some undiscovered stream or above the little lake which nestles between the hills.

Above all search out the picturesque dirt roads, grass grown and unspoiled with heavy traffic. Jog along slowly, don't above all, be in a hurry. Let the folks get out when they want to and pick the flowers that always grow beside this kind of a road."

If you wish to renew your youth, and have the sparkle of unalloyed happiness in your eye, join this club of motor vagabonds and wander in the untrod byways. By S. L. Sherill, Birmingham, Ala.

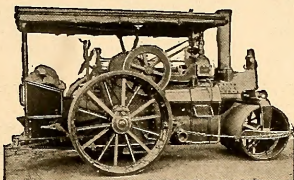
Candidates who are afraid to advocate improved roads, had best be kept at home. This means that they are untrue to their expressed desire to save the country.

The best way to get road improvement started is to begin with the split log drag. This habit then becomes contagious.

The commissioners of Greene county, Mo., have contracted for 11 steel and concrete bridges.

Lampasas, Tex., has voted bonds for \$14,000 to build four bridges.

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Information and prices F. O. B. cars your siding or laid in streets, on request.

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The big economy factor in the I H C road tractor is this: In various capacities it can be kept at work every minute of the time—first, as a road roller—second, to pull grading machines, haul stone and other material, and move concrete mixer—third, as a belt power engine, to run stone crusher or concrete mixer. Several machines in one and it operates on cheap low grade fuel.

The I H C Road-Roller Tractor is a favorite because it is of simple mechanism; is economical in fuel; has moving parts thoroughly protected from dirt and grit; is always ready for work on the instant.

I H C road tractors are made in 20 and 25-H. P. sizes. The I H C line also includes tractors for every use, from 6-12 to 30-60-H. P. sizes; and a full line of engines for every use, from 1 to 50-H. P. sizes. Write for catalogues on any or all I H C engines and tractors.

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GOOD ROADS NOTES IN BRIEF

The Good Roads Committee of St. Tammany parish, Covington, Louisiana, announce that they are about to contract for the construction of 275 miles of improved dirt roads throughout the parish.

The thriving city of Greensboro, N. C., has voted \$100,000 of bonds for streets.

Lillington and Little River townships, of Harnett county, N. C., have each voted bonds for \$20,000 for road work. Hector's Creek township, in the same county, voted \$10,000 of bonds.

Henderson county, Tenn., votes this month on a bond issue of \$150,000 for roads.

Pulaski, Va., votes on the 22nd on the question of issuing \$80,000 of bonds for street improvement.

Elizabeth City, N. C., has awarded contracts for paving amounting to \$10,000.

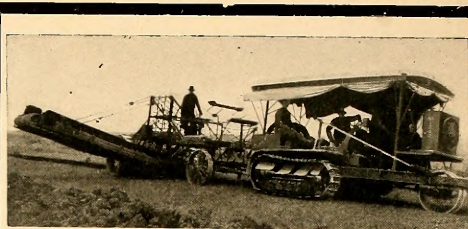
Lonoke county, Ark., will construct 11 miles of macadam at a cost of \$39,000.

Madison county, N. C., has contracted for the grading of nine miles of road at a cost of \$34,454.

Greene county, N. C., has contracted for road-building amounting to \$50,000.

Dawson, Ga., will pave two streets at an estimated cost of \$58,000.

WANTED—Position as rodman on survey in Western North Carolina. Highway work preferred, though other branches will be acceptable; 18 months' experience. Can do stenographic and book work in office. Highest of references as to ability and character. Can accept at once. Address: H. K. Williams, Sanford, N. C.



This Tractor is Different

The Caterpillar is away ahead of round-wheel tractors—we made that kind 20 years ago and quit when they went out of date. The Caterpillar works on *any* road because it lays its own tracks, rolls over them and then picks them up. These twin tracks are so long and so wide that they don't mire—even in sand. They get a grip on any surface. You can work with the Caterpillar when the other fellows with horses and round-wheel tractors are tied up on account of bad roads or weather. This big bearing surface also prevents any injury to the subgrade or finished road.

You can always depend on the Caterpillar, but you can't always hire extra teams when your horses get sick or lame.

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This is actually true of the Vanadium Tungsten Iron we use for the Cylinder, Chest and Airhead in

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It wears **THREE TIMES** as long as cast iron. It's as close-grained as silver. The extra long bronze bearing is another reason for "Wood" Superiority.

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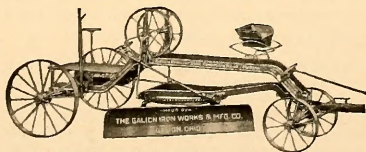
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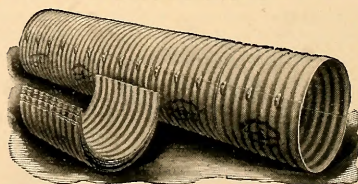
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SOUTHERN GOOD ROADS

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Sixth Annual Convention Southern Appalachian Good Roads Association

By DR. JOSEPH HYDE PRATT, Chapel Hill, N. C.

IT was unanimously decided at Asheville in October, 1913, to hold the next annual convention of the Southern Appalachian Good Roads Association at Bristol, Virginia-Tennessee, October 6-9, 1914. This association includes the states of Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia and Alabama, or the portions of them lying within the Southern Appalachian mountain region. Similar conditions and topography, natural resources, etc., together with the purchase of vast areas of these mountain lands by the Federal Government and their use as national parks, all make it of the interest to the people in this general region to work together to secure well-built highways connecting all the sections of this vast area together and also bringing it into communication with other sections of the country through national highways.

The Bristol Board of Trade is co-operating most actively with the association in arousing an interest in the convention and working to secure the largest number of delegates which have ever attended any of the conventions of this association.

Efforts are being made to arrange a program which will be instructive and interesting, and among those who have been invited to attend and make speeches are Senators Swanson and Martin and Governor Stuart, of Virginia; Governor Craig and Hon. John H. Small, of North Carolina; Senators Lea and Shields and Governor Hooper, of Tennessee; Senator Smith, of Georgia; Senator Bankhead, of Alabama; Senator James and Governor McCreary of Kentucky; Governor Hatfield, of West Virginia.

In addition to the above the National Highways Association will probably be represented by the Honorable Charles Henry Davis, president, who is at present in England but expects to be in this country by that time. The American Highway Association will be represented by Hon. Charles P. Light, Field Secretary; the American Automobile Association by Hon. A. G. Batchelder.

Other road organizations which will be represented at this convention by the president or secretary are:

North Carolina Good Roads Association.

South Carolina Good Roads Association.

Tennessee Good Roads Association.

Kentucky Good Roads Association.

Southeastern Kentucky Good Roads Association.

Alabama Good Roads Association.

Virginia Road Builders' Association.

Georgia Federation of Road Authorities.

Appalachian Park Association.

There will also be some distinguished road engineers who will give technical talks or papers in regard to various phases of road work. Among those who have consented to present such papers are Major W. W. Crosby, of Baltimore, Md., whose subject will be "Maintenance of Roads." The question of road construction, location of the various types of roads, such as various macadam, sand-clay, gravel, etc., will be taken up in papers by engineers and a general invitation extended to all the delegates to take part in the discussions.

Special reports will be made on the progress of through highways, such as the Bristol-Washington Highway; the Bristol-Memphis Highway; Bristol-Norfolk Highway; Bristol-Bluefield Highway; Knoxville-Cumberland Gap-Cincinnati Highway; Charlotte-Asheville Highway; Crest of the Blue Ridge Highway, National Highway, etc.

The morning of the 9th there will be a short demonstration of maintenance of macadam roads by using a scarifier and re-surfacing. The Bristol Board of Trade will also arrange for certain forms of entertainment not yet announced.

In view of the fact that Western North Carolina is in the very midst of the Southern Appalachian region there should be a widespread interest in this convention among those living in this section of the state. It is hoped that large delegations will attend from the cities and rural districts in this section. With a network of good roads passing through North Carolina from South Carolina on the South, to Virginia on the North and Tennessee and Kentucky on the West, there would be no difficulties in the way of tourists desiring to come into this section for the summer and autumn seasons, and there is no doubt but that a large number would come from both the North and South to this most delightful climate and beautiful scenery. The development of such a trade would mean untold wealth to this general region, and this is being pushed by a number of agencies. One of these is the Appalachian Park Association, which will have a representative at this convention who will give the delegates an idea of what is being done to secure good roads through the national parks purchased by the govern-

ment and the connecting of these roads with other good roads leading to adjoining counties and states.

Awards will be given to the county which has the largest number of delegates present, according to the distance traveled as measured from county seat; to the county making the best exhibit of road pictures, showing roads before and after improvement; and to the county which has the largest number of paid-up members of the Southern Appalachian Good Roads Association, whether these members are in attendance or not.

The principal addresses will be made on the 7th and 8th of October, as only preliminary business will be conducted the 6th, and the 9th will be given up principally to an inspection of the roads around Bristol.

Naming Delegates to Fourth American Road Congress.

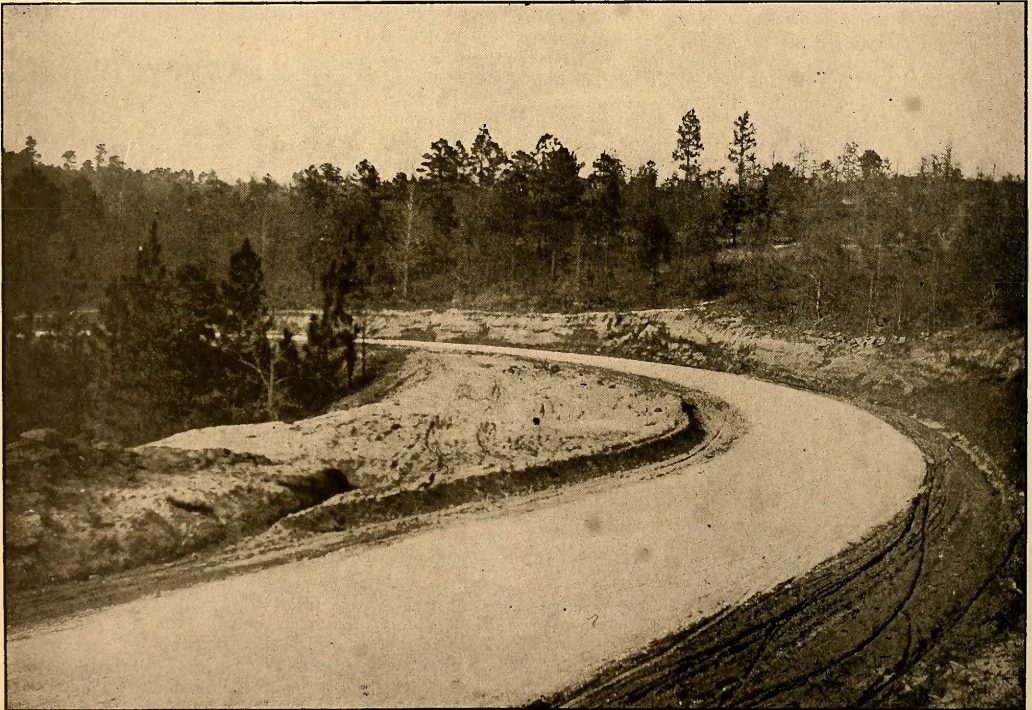
The mayor of Lexington has been requested by the Hon. A. B. Fletcher, president of the Fourth American Road Congress and State Highway Engineer of California, to name three delegates to attend the sessions of the congress at Atlanta, Georgia, during the week of November 9th.

Forty-seven great organizations are taking part in the congress under the leadership of the American Highway Association and the American Automobile Association. In his letter to the mayor, President Fletcher calls attention to the fact that practically every state highway commissioner will be present and take part in discussing the important problems of

road construction and maintenance, and that some of the foremost men in public life will devote their attention to the great question of federal aid to road improvement, in an endeavor to work out a policy which may be submitted to the congress of the United States with the support of the organized road movement of America. An important move bearing upon state legislation will be made at the session to be held under the auspices of the American Bar Association, at which a joint committee, appointed at the 1913 congress, will report progress in compilation and suggested revision of state road laws. The creation of a commission participated in by each state to work out a revision of the road laws will be urged. The National Civil Service Reform League will hold an exceedingly important session on the merit system in road administration.

President Fletcher calls attention to the exhibits to be made by the United States Government, the states, and more than a hundred of the leading manufacturers at the congress, which will illustrate every known method, material and equipment for road construction and maintenance. He urges that the city and county be officially represented, as the congress is in reality a training school where a very great amount of useful information can be obtained through attendance at lectures with leading specialists in road and street work and the collecting of the many instructive bulletins which will be available for distribution.

The headquarters of the congress are in the Colorado Building, Washington, D. C., in charge of I. S. Pennybacker, executive secretary, and the exposition is in charge of Charles P. Light, business manager.



Re-location of Enterprise road descending Mt. Barton, in Lauderdale County, Miss., showing a section of 5,300 feet of continuous 6% grade instead of 18% grade on old location

Road Construction in Lauderdale Co., Miss.

By W. F. MOORE

Chief Engineer, Meridian, Miss.

FOUR YEARS AGO, District No. 1 of Lauderdale county (in which is situated Meridian) awakened to the necessity of improving their roads as the only means of bringing this county to the state of development to which it was justly entitled, so they attempted to float bonds as a county proposition for that purpose. But the rural districts objected, and voted it down. The state legislature being in session at the time, the business men of Meridian called a meeting and framed a bill to be presented before the legislature, allowing each supervisor's district to issue bonds for the improvement of the roads in that district, the said district to be taxed independently of the other districts of the county to meet the payment of the bonds. This bill was passed by the legislature and under it two hundred thousand dollars in bonds was issued by District No. 1, without opposition. The bill also created a road commission to be composed of three property holders, who were to be appointed by the board of supervisors and serve without pay.

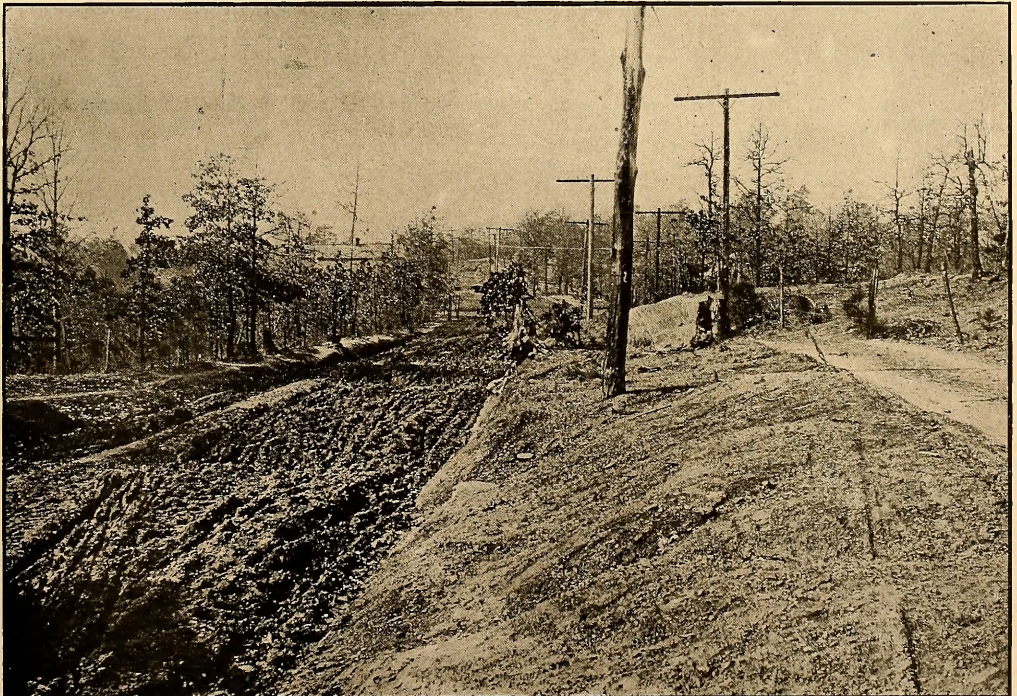
The writer of this article was employed by the above described commission the first of December, 1911, and took up the duties of locating and planning a system of modern roads that would meet the existing conditions surrounding the city—with the following results:

I soon found there was considerable skepticism among

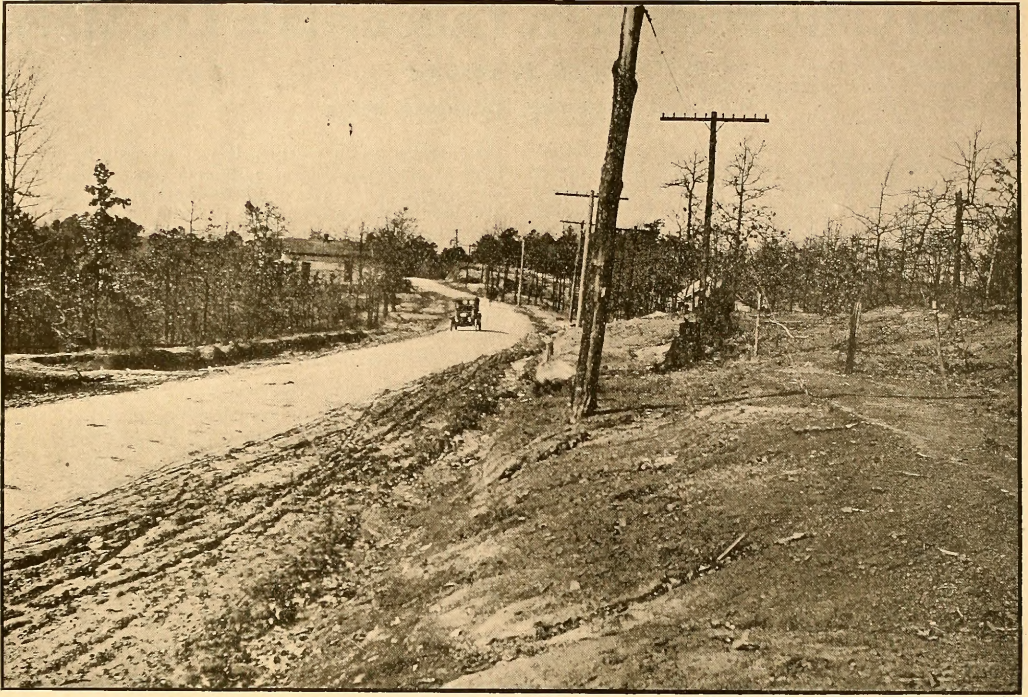
the farmers, as to whether it was possible to build a road at anything like a reasonable cost, which would go through one winter of Mississippi's rainy season. I also found there was no local material except sand and clay and that it was not of good enough quality to build a road which would take care of the heavy travel created by the large trade territory of Meridian. So after considerable investigation of prices, freight rates, etc., we decided upon a stone mined at Tamms, Ills., with which to construct the main thoroughfares. This stone is very hard and has exceptionally strong cementing values.

After thoroughly considering the conditions, the commission decided to use Meridian as a hub, and build, first, four of the main roads to an extreme limit of five miles from the corporate limits, in the four cardinal directions, thus making a demonstration that would be seen and used by as many of the country people as possible. The second contract was let for four additional roads, to as nearly as possible divide the distance between the first four, still using Meridian as the hub; sufficient money was borrowed for their completion.

When these roads were planned there were only about ten or twelve automobiles in this county, but by the time of their completion there were four or five hun-



Bad Road near Meridian, Mississippi. Note how pedestrians have worn paths along the banks of the road, through the woods, to dodge the mud.



The Same Road, Photographed by the U. S. Office of Public Roads, after a Model Clay Gravel Surfacing had been put on.

dred, carrying with them the usual bad effects of motor driven vehicles on stone or gravel roads. To overcome this we have applied, by the penetration method, a blanket coat of 90% to 95% asphalt with a crushed stone and sand filler. This application was made with such marked success that it is now being used not only in the adjoining counties but over a majority of the south, and has made Meridian's roads famous. The accompanying views show the class of construction in this district.

Every man in Lauderdale county is now convinced and is a road booster, and the only complaint we have is from a few of the city people who say that everybody is moving to the country and that city property is suffering thereby. The advancement in property values along these roads has been remarkable. It has doubled, trebled, and some of it has actually sold for five times its original selling price, and in the short space of three years. On some of these roads the property has been sold in small blocks for a distance of three miles and is being built into some of the most beautiful suburban districts in the south.

When I tell of the marvelous increase in property values along these roads, I remember a story told by my friend, J. M. McBeath when he was addressing a good roads convention at this place last fall. Some one in the audience asked him, "What has been the percentage of increase of the lands contiguous to your good roads?" He answered by telling the story of an Irishman who was writing to his brother in the old country, saying, "Dear Mike: This is the grandest country you ever saw. I am getting \$2 per day and my board, and I get meat to eat three times a week." His employer saw the letter and said to him, "Dennis,

why don't you tell him the truth; you have meat every meal if you want it." To which Dennis replied, "Faith, and I am afraid to tell him the truth, for then he won't believe a d—d word I've said."

As a further illustration of the practical benefits of the road work in this county, District No. 1, alone, has issued four hundred thousand dollars in road bonds, and instead of having to raise the rate of taxation to take care of them, when the taxes were assessed last fall the increased valuations enabled the county officials to lower the rate. This is as strong an evidence of road building being a paying investment as it is possible to produce.

Upon completion of the work now under contract, this District, which is the center district of the county, will have made of every main road leading from the city to the District line, a first class highway—a highway practically noiseless and free from dust, and equal in appearance and smoothness to any city street in the south. The outlying districts, violently opposed to road building at the start, have thoroughly awakened to the desirability and necessity of them and are extending their roads to the county line. So that when the entire system is completed, Lauderdale county will have fifteen scientifically located and modernly constructed highways radiating in every direction from Meridian to the county line.

The superior class of construction of the roads in this district has not only attracted the attention of the people of the outlying districts of this county, but has a state-wide reputation, resulting in a State Highway Convention meeting here last fall at which plans were perfected whereby the first four roads we built will be extended, not only through this county, but to

the Gulf on the south; to the Mississippi river on the west, (through Jackson and Vicksburg); to connect with the Memphis to Bristol highway on the north, at Jackson, Tennessee; and on the east to connect with Alabama's highway running east and west through Montgomery and Selma.

I have avoided any semblance of technicalities in this article, but have attempted to illustrate the fact that road building by a county with borrowed money, provided the adoption of routes and the selection of material is wisely made, and the engineering department gives value received, is not an expense but an investment. I believe that just as serious mistakes can be made by spending more money per mile in building a system of county roads than the conditions demand or will permit of, as is often made in building them too cheap to meet the conditions. The expenditure of public money is due the same careful consideration that an individual gives his own business transactions.

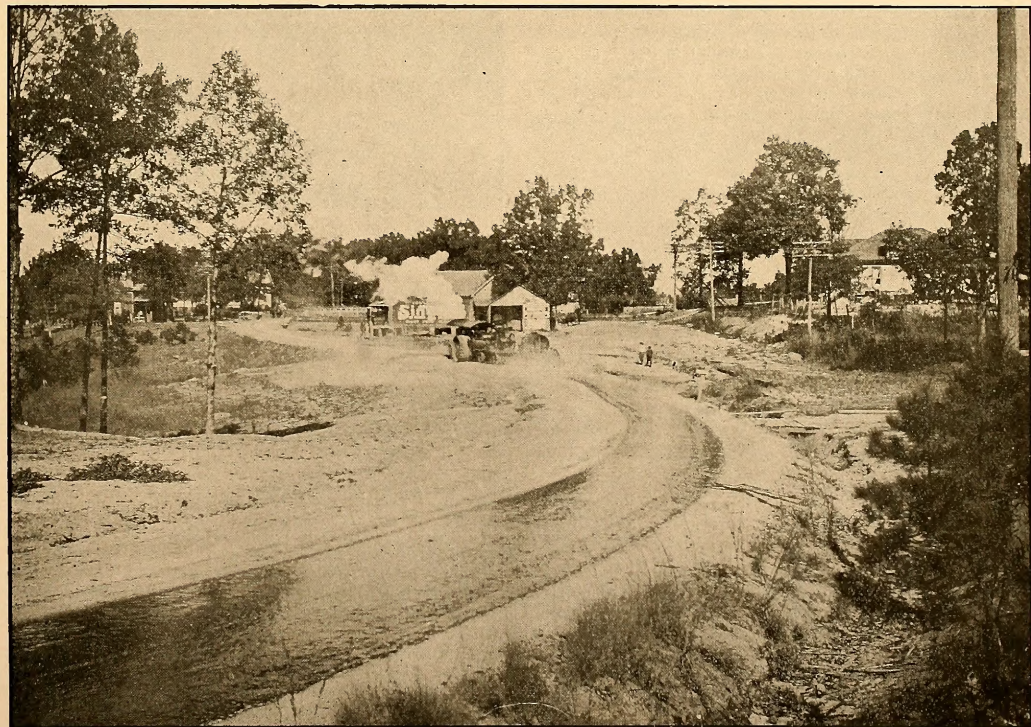
By meeting conditions as they existed and taking advantage of every opportunity as it presented itself, Lauderdale county has forged to the front. Four years ago there was not a foot of improved road in the county. Three years ago a system of district roads, with Meridian as the hub, was started. Today Meridian is the center of a system of county and inter-county highways. As soon as the missing links are filled, connecting the portions of state highways already completed, Meridian will be the hub of a great system of state and interstate highways that will give her access to any part of the United States.

Good Roads Rally at Edgefield, S. C.

Good roads rally was held at Edgefield, S. C., on Friday, June 19, primary object being to devise the ways and means to lay the road from that point via Trenton to August.. The meeting was called to order by Mr. J. D. Mathis, of Trenton, who introduced Mr. G. W. Wier, a government civil engineer. After emphasizing the importance of good roads and the forward movement being made along this line throughout the entire country, Mr. Wier gave a detailed statement of the work and cost of the contemplated improvement, estimating that it could be done for \$500 per mile. The supervisor of Aiken county was present and said that their end of the line would be looked after. As far as Edgefield county is concerned it is proposed to pay for the work by private subscription, and the money will very likely be raised.

Cuyahoga county, Ohio, will add sixty miles of rural brick road to its 400 miles of similar pavement, according to the 1914 road improvement plans announced by County Engineer Stinecomb, thus strengthening its distinction of being the best paved rural district of any similar area in the world. A minimum width of 16 feet has been adopted for roads to be laid during the coming summer and the entire expenditure, including fills, bridges, etc., will be somewhat in excess of \$900,000.

Goldsboro township, of Wayne county, North Carolina, will build 22½ miles of good roads.



Showing method used under the direction of Engineer W. P. Moore in applying asphalt to surface of Lauderdale county highways

A State Highway Commission For N. C.

*By HON. W. A. GRAHAM, Oxford, N. C.

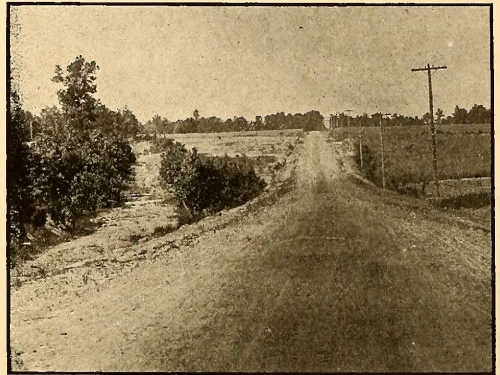
IF IS indeed a pleasure to be with you on this occasion. Not that I think anything I may say can instruct this audience, in the art of road building, but because it has afforded me an opportunity to "sit at the feet of Gamaliel" and learn from those who know whereof they speak; and because it affords me an opportunity to express my gratification at the result of the work which I attempted to inaugurate 29 years ago, when as senator from this district, Orange, Person and Caswell counties, I introduced and had enacted the road law for Durham, Orange, and Granville, patterned after the Mecklenburg road law, which, with its many amendments and its efficient execution, has spread a net work of highways and roads over the county of Durham that has become the model for the macadam roads in central and eastern Carolina. Unfortunately the authorities of Orange and Granville counties had that portion of the law, applicable to themselves, repealed at the next session of the legislature, while Durham amended and improved hers, until today in the matter of roads, as well as in some other things Durham is truly 29 years a head of us. But our people have awakened to the opportunity, not then realized; they have taken hold in earnest, and I venture the prediction that another 29 years will see the people of three counties nearer on an equality in all material matters than now. For, when you get a Granville, or an Orange man aroused and thoroughly in earnest, he is no laggard in any race which he may enter, as the people of this city, composed largely of citizens of those two counties, so well know.

And just here, may I be pardoned for saying that in procuring the enactment of the Durham road law, no man rendered more efficient assistance than my honored friend Caleb B. Green, then representative from Durham, but long time clerk of your superior court. Then as always he was alert for everything that tended to the uplift and betterment of his county, and Durham, nor any other county, ever had a more faithful representative, or more useful citizen than Caleb B. Green.

This is an era of progress, not alone along lines political and financial, but economic and domestic as well. There is awakening of public consciousness, upon matters that affect our civic life, to a degree that might be called almost revolutionary, and the question in all its forms, is arousing an interest, little dreamed of twenty years ago.

The system of control of public highways through a state commission has many advantages over that by counties or townships. The necessity of a state highway commission, for the state of North Carolina, no longer admits of argument. Observation on our part, and actual experience in other states, has demonstrated the futility of attempting to afford adequate benefit to the whole people of the state through the various county, township, and local district systems that prevail in certain sections of the state. We are, or ought to be a homogenous people, and whatever internal improvements are inaugurated, should be conceived and undertaken for "the greatest good to the greatest number." In matter of building roads, certainly "no man liveth unto himself" and "no man dieth unto himself." For a good road cannot be used or enjoyed

alone by the individuals who built it, or the community in which it is located, but by every one who passeth that way. Whether we will it or not, it is destined to become a part of that great net work of highways, with which our state will certainly in a few years be covered. Owing to the advance of education among the masses with the resultant desire for still greater knowledge, and the wish to actually see and participate in those matters and events of which they read, our people have become more restless, as it were, and are seeking for means for more rapid transit and communication among themselves and among their neighbors. Can this be but a feeble expression of that "wanderlust" that seems to have been a characteristic of our race ever since it left the steppes of Asia and the broad plains of southern Russia? The extension of the free delivery system of mail as well as the parcel post, to the rural districts, has created a demand for more and better highways that can but be accomplish-



Stretch of gravel road on the Capital-to-Capital Highway in Lee County North Carolina

ed through a State Highway Commission alone. We must have better facilities for transportation not only of ourselves, but of those articles which we wish to deliver to our customers in the city, or which we purchase in the city and deliver to our people. No longer will our people be willing to pay the enormous mud tax which is represented by over-strained teams, broken wagons, or reduced size of the load and time occupied in delivery, while our neighbors can carry three times the weight, with half the trouble and in one-third the time that it takes us to travel the same distance.

One of the chief functions of a Department of Highways or Highway Commission, should be the supervision and direction of all public road building in the state, and the maintenance of the same. What we need is to arouse the interest of all the people within our borders, to the importance, in fact to the necessity of North Carolina having a splendid system of public highways connecting every county seat with the capital of our state. And how can this be better accomplished than by establishing a highway commission, which shall not only furnish material aid, and skilful engineering assistance to such counties as need and

*An address delivered before the North Carolina Good Roads Association at Durham, July 9-10.

ask for it, but shall make special efforts to inform our people upon the advantages of our improved system of roads by proper literature, and addresses, and by conference with them, as how best to secure them, for any locality sufficiently interested to demand them.

Another great benefit that could be derived from a highway commission would be the proper direction of the expenditures of the large sums of money that have been voted by counties, townships and road districts, within the past two years, to the building of bridges and public roads. It has been estimated that under authority of Chapter 112 Laws of 1913 and kindred acts, the sum of over \$400,000 has been voted for the building of improved roads in certain counties in the state. In most of those counties no adequate provision has been, or will be, made for proper engineering skill in the location and construction of these roads. It is believed that at least one-fourth of this vast sum could be saved if its expenditure could be directed by competent and efficient road engineers.

In 41 of the 48 states union, departments of highways, or highway commissions, have been established by the states, and funds appropriated to the maintenance of the same and working the roads, ranging from \$11,300,000 in New York, down to \$5,000 in North Carolina and \$3,000 in Wyoming. In our sister state of Virginia the amount is \$463,000, while in Maryland it is \$3,700,000. And in Georgia the entire convict force of the state, amounting to 4,000 men, short as well as long term convicts, has been assigned to work on the public roads.

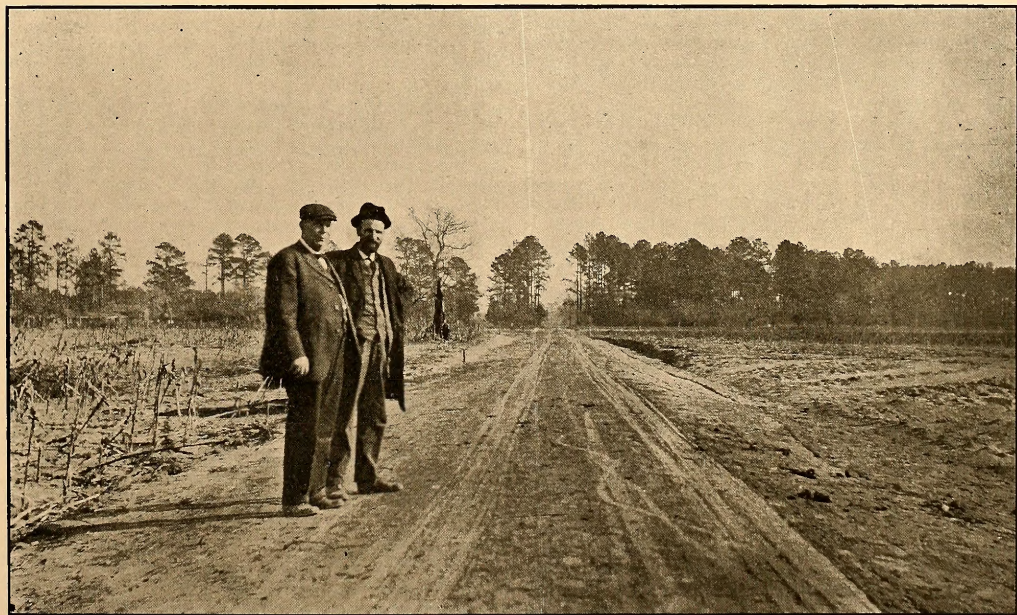
And just here permit me to digress long enough to urge that this meeting do not adjourn until we pass a resolution, demanding that the legislature enact a law similar to that of Georgia, withdrawing all able-bodied convicts from the state farms and from railroad works, as soon as it can be done without injury

to the state, or violation of any contract the authorities of the penitentiary may have entered into with any railroad or other corporation in the state; (it is estimated that we have nearly as many convicts (long and short term) as there are in Georgia) and that all convicts be assigned to the public roads to be worked under the highway commission. They could be worked in gangs or squads, large enough to accomplish the best results, at a minimum expense.

As long as the sentiment for good roads was confined to Mecklenburg the pioneer, Forsyth and one or two other counties, there was no occasion for a department of highways. But now that the heaven furnished by them has permeated our whole body politic and the entire state is aroused, a department of highways as the main director of this widespread energy is urgently demanded. The interest involved is too great and the parties and communities to be served too numerous for the appointment of an efficient head of the system to be longer delayed.

In my opinion, the department of highways, or highway commissions, should be composed of five persons consisting of the governor, who should be ex-officio chairman, and the professors of engineering at the University and A. & M. College, to be designated by the governor and two other citizens of the state to be designated by the governor also, with power in the governor to fill any and all vacancies.

This highway commission, or department of highways, should elect some man of approved knowledge and skill in road building and good administrative ability, regardless of the state in which we may have been born as commissioner of highways, who should be charged with the supervision of the entire road system of the state, under the direction of the highway commission. And he should be empowered to appoint such assistants in each congressional districts, as the

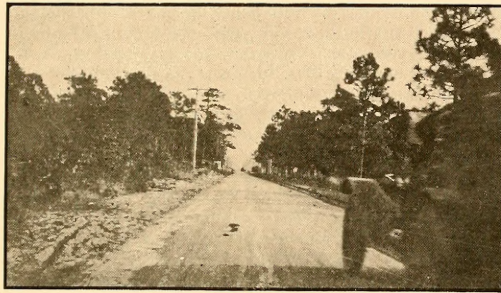


Fine Sand-Clay Road in Edgecombe County, built under the supervision of Mr. J. W. Martin, who appears in the picture

necessity of the work might demand. But he should not be limited in his choice to any districts.

His entire aim should be to select men who would accomplish results in the shortest possible time.

Now as to how this department of highways could be supported, there is either of two ways: first from the automobile tax, or tax on all the real and personal property in the state. While the appropriations to this department should not be so extravagant as to beget waste, still it should be adequate not only to pay the expense of the highway commissioner and his assistant, but to provide a fund sufficient to enable the department of highways to aid in building sections of roads in various counties, which think they are unable to bear the total expense of the construction and maintenance of the highways in their borders. A system of state aid to counties and districts has proven of decided benefit of such states as Maryland, Virginia, New Jersey, Alabama and others. And it is especially useful in counties where a majority of the tax-payers have not yet awakened to the importance of good roads, but



A Fine Tarviated macadam road in New Hanover county, North Carolina.

there are good localities in which the people are willing to tax themselves in order to inaugurate the system, with its resultant benefits. To such localities the state should extend a helping hand, for there is no better means of education than one or two sections of good roads in a county.

There are now more than 12,000 automobiles, auto-trucks, motorcycles and other motor driven vehicles in the state, the owners of all which are peculiarly dependent upon good roads for comfort and convenience in operating the same. The present license tax on each horsepower, yields about \$60,000 which is paid direct to the state treasurer, who under Chapter laws of 1913 retains 20% and returns 80% to the counties paying the same, which for the lack of proper supervision in its expenditure is usually wasted. No other class of tax-payers is so peculiarly dependent upon good roads for the proper enjoyment of their property as the automobile man; and, as he has to pay this license tax, in addition to the ad valorem tax upon his machine, it is but just and right that it should be expended in such a way as to make the uses of his property more comfortable, convenient and more profitable to him, especially when by so doing you are benefitting every other tax payer in the county, by affording him a more expeditious means of transportation for himself and the product of his farm.

And again this fund should be expended through a state department for no longer does the auto-owner confine his activities to the township or county, but we often find him in his afternoon outing traversing three, four or even five counties and the amount of

his pleasure is dependent upon the conditions of the public roads in each of these counties.

But if it should be thought best, as the highway commission is a department of the state, that the burden of its support should not be imposed upon one class of tax payers alone; then I would suggest a moderate tax upon all property, real and personal, in the state. For certainly the value of all would be greatly enhanced by the construction of suitable highways in every county.

The amount of real and personal property in North Carolina for the year 1913 was over \$730,000,000, a tax of 10 cents on each \$100 of which would yield \$73,000 per annum, which in my opinion would be sufficient to inaugurate the movement and show the people of the state what can be accomplished by the judicious expenditure of a small sum of money.

Colorado-to-Gulf Highway Becomes Part of Puget Sound-to-Gulf Highway.

At a meeting of the board of directors of the Colorado-to-Gulf Highway held at Plainview, Texas, last month it was decided to merge that organization into a larger organization and the association is now apart of the Puget Sound-to-Gulf Highway Association.

The Puget Sound-to-Gulf Highway extends at present from Seattle to Raton, N. M. The new connection gives it egress to the sea at both Galveston and Corpus Christi.

The route from Raton will follow the line of the Colorado-to-Gulf Highway, with the exception that Kerrville, Junction and Menard are eliminated. From San Antonio northwest, the stations are Fredericksburg, Mason, Brady, Paint Rock, San Angelo, Sterling City, Big Springs, La Mesa, Tahoka, Lubbock, Plainview, Tulip, Canyon, Amarillo. From the latter city the line will run west to Raton..

Officers of the Colorado-to-Gulf Highway elected at the Plainview meeting are: President, S. A. Penick, Big Springs; vice president, U. M. Unger, Plainview; secretary-treasurer, Thomas B. Owens, San Angelo.

Puget Sound-to-Gulf Highway officers will be elected at a meeting of delegates of all divisions, to be called within six months.

Mr. D. E. Colp, secretary of the Bexar county highway league and one of the leading spirits in the Colorado-to-Gulf Highway Association, was in attendance on this meeting. He made the trip to Plainview by automobile with Col. A. L. Westgard, vice president of the National Highways Association. Good roads clubs were organized in sixteen counties en route. Moving pictures of highway scenes taken along the line will be shown soon in San Antonio and other cities. Colonel Westgard now is mapping and logging the highway between Amarillo and Raton. Early this month Colonel Westgard and Mr. Colp will lead a party of automobilists from San Antonio to Winnipeg, Canada.

Good Roads Don'ts.

Don't just enthuse over the subject; get busy and fuse also.

Don't cast your die on one character of construction; there are no "wear-forever roads."

Don't stop your interest when the road is built; the highway needs your kindly interest and care at all times.

Don't make ruts with your wheels; it tears up what you have aided in building, and gives the road a pain in its back.—Homers D. Wade, Stamford, Secretary Texas Good Roads Association.

Gravel and Stone---Qualities, Tests and Selection

By A. T. GOLDBECK

Testing Engineer, U. S. Office Public Roads

IN THE many elements which make for the success of a waterbound macadam or gravel road, there is none of more vital importance than that of the proper selection of the stone or gravel entering its construction. The rock must be adapted to properly combat the conditions of traffic and the destructive elements of nature which it must encounter. Passing vehicles and horses' feet exert a pounding or impact action on the road surface and at the same time subject it to wear through abrasion. The result is a pulverization of the surface material, a necessary destructive effect since the integrity of the road is maintained through the cementing or binding power which the rock dust thus formed exerts on the larger particles of stone. Much of the powdered material does not remain in place on the road surface, but is washed away by the rains and is scattered in clouds of dust raised by the winds. The ideal condition is realized however, when the wear of travel produces just sufficient binder to hold the road stones together. When excessive wear grinds up too much fine material, dust and mud must develop. On the other hand lack of wear will produce too little dust to replace that lost through the mechanical action of the elements, and the larger particles deprived of their firm and binding support, becomes loosened by passing vehicles and the road surface ravels.

When heavy and continuous travel is to be carried, nothing but hard, tough rock of good binding qualities will give satisfaction; for should the stone be lacking in hardness or toughness, excessive dust in dry weather and a muddy surface in wet weather will be produced. Light and intermittent travel requires material which will more readily grind to powder in order that sufficient binder may be produced to replace that lost through the mechanical agencies of wind and rain. It would be just as unwise under most weather conditions to construct a lightly traveled road of hard tough trap, as to build a heavy traveled road of soft friable limestone, since in the first case the road would ravel through lack of sufficient binding material to hold it together, while in the last case excessive powder would be formed with the production of a dusty, and sometimes muddy surface.

Agencies other than the mechanical action of traffic attack the road surface with destructive effect, and most severe among these is frost. Although it is probable that the rock in the road surface is not effected very much by frost, the expansion, due to the freezing in a very porous surface, is considerable, making it all the more desirable in the selection of a road material to procure one with as high a cementing value as possible in order to form a dense impervious surface.

Physical Qualities of Road Building Rock.

It will be recognized that a road building rock must possess the following characteristics in order that the road surface may be preserved in good condition; it must be of sufficient hardness and toughness, and it must have good cementing or binding qualities.

The hardness of a road material measures its ability to resist the abrasive action of traffic in causing displacement of the surface particles by friction.

The toughness of a rock is a measure of its ability to resist rupture due to the impact of traffic.

The cementing or binding power of a rock determines how firmly the individual stones will be cemented together by the rock powder formed through the action of traffic.

There is one other feature which is doubtless of much importance in judging of the probable bond of the rocks in a road surface, namely, the shape of the finer particles of the rock or screenings. Sharp angular particles, through their wedging, non-rolling effect, are doubtless more efficient in aiding the bond of a road surface than are fragments of rounded shape, and this factor should be taken into consideration in judging of the probable action of the road surface under traffic.

The Testing of Rock For Road Building.

The testing of rock for road building has been carried on for over thirty years, the first systematic attempt to determine the relative value of road building rocks having been made in the French school of bridges and roads in 1878. It was here that the Deval abrasion test for rock was developed, and it is at the present time standard throughout the United States. Not until 1893 did this country begin the serious investigation of road materials, but during that year the Massachusetts Highway Commission established a laboratory in the Lawrence Scientific School of Harvard University under the direction of Mr. L. W. Page. In 1900 the United States Government installed a laboratory in the department of agriculture, and this is now a part of the organization of the Office of Public Roads, where the testing of road materials is undertaken without charge for any citizen of the United States who may apply for its services. The necessity for the investigation of road metal has likewise led to the installation of testing equipment in many technical institutions both of this country and abroad, and to the establishment of road materials laboratories by many state highway commission.

Physical Tests of Road Materials.

The following tests are of value in investigating the physical qualities of rock for road building: (1) Hardness, (2) Toughness, (3) Resistance to Wear, (4) Cementing Value, (5) Specific Gravity and (6) Absorption.

Dorry Hardness Test.

To judge of the resistance of rock to the abrasive action of traffic, a core one inch in diameter is cut from the solid rock by means of a diamond core drill and subjected to the grinding action of standard quartz sand, between a No. 30 and No. 40 sieve, fed on a revolving steel disc against which the test piece is held with a pressure of 1250 grains. When the disc has made one thousand revolutions, the loss in weight of the sample is determined. In order to report the results on a definite scale which will be convenient, the method has been adopted of subtracting 1-3 of the resulting loss in weight in grams from 20; thus a rock losing 6 grams has a hardness of 20 minus six thirds, or 18. Through a consideration of the results of hun-

dreds of tests, the following interpretation of the hardness tests seems to be a fair one; below 14, rocks are called soft; from 14 to 17, medium; above 17 hard. The arbitrary constant 20 was selected with a view of giving the results of this test about the same range of variation as the French coefficient of wear to be described later.

Toughness Test.

To resist the severe impact of traffic on the roadway, road material must possess the quality of toughness to a high degree, and this quality is tested in a machine designed on the pile driver principle.

The specimen consists of a core 35 mm. (one inch) in diameter and 25 mm. high, cut from the solid rock by means of a diamond core drill and carefully faced off at both ends on a grinding lap. A spheri-ended plunger is brought in contact with the specimen and a two kilogram weight is allowed to fall on the plunger, thus approximating the blows of traffic. The height of the first blow is one centimeter and each succeeding fall is increased one centimeter in height until the specimen ruptures. The height of the last blow, which corresponds with the number of blows delivered, is taken as the index of the toughness of the specimen. This test was designed by Mr. L. W. Page and has been adopted by the American Society for Testing Materials. In interpreting the results, rocks which run below 13 blows are called low; from 13 to 19, medium, and above 19, high.

Abrasion Test.

The abrasion test, as performed in the Deval abrasion machine, tests the hardness as well as the toughness of rock, and since its development in the French school of bridges and roads, much valuable information has been obtained on the wearing qualities of rock. This test, which is a hardness and toughness test com-

bined, acts as a very good check on the results of the separate hardness and toughness tests, and is performed as follows: Eleven pounds (5 kg.) of broken rock between $1\frac{1}{4}$ and $2\frac{1}{2}$ inches in size. 50 pieces if possible, are placed in a cast-iron cylinder mounted diagonally on a shaft and slowly revolved 10,000 times. Material which passes a 1-16 inch sieve is considered as worn away, and the per cent of wear is calculated on this basis. The French co-efficient of wear is obtained by dividing 40 by the per cent of wear. Thus a rock showing 4 per cent of wear has a French co-efficient of wear of 10. The French engineers, who were the first to undertake road-material tests, adopted this method of recording results. They found that their best wearing rocks gave a co-efficient equal to about 20. The number 20 was, therefore, adopted as a standard of excellence. In interpreting the results of this test a coefficient of wear below 8 is called low; from 8 to 13, medium; from 14 to 20, high; and above 20, very high.

Page Impact Cementation Test.

The cementing power of a road material to act as a cement on the courser fragments composing the road. This property varies greatly with different kinds of rock, and the absence of cementing power is so pronounced in some varieties that they can never be made to compact under the roller. Other rocks bind together very readily and form a firm impervious surface, very highly resistant to the wind and rain and the ravelling action of traffic. The method of testing the cementing value of rock dusts is as follows:

One-half kg. of the rock to be tested is broken sufficiently small to pass a 1-3 inch mesh sieve. This material is placed in a ball mill together with 90 cc. of water, sufficient to produce a stiff paste after grinding. The mill contains two steel shot weighing about 20 pounds each and is revolved at the rate of



A Piece of Tarviated Macadam Road in New Hanover County, North Carolina. The Road is as Straight as an Arrow
Mr. R. A. Burnett, one of the County Road Officials, is Seen in the Picture

2000 revolutions per hour. At the end of 5000 revolutions the materials removed from the mill and compressed into briquettes 25 mm. high and 25 mm. in diameter under a pressure of 132 kg. per square centimeter.

After drying for 20 hours in the air and 4 hours in a hot airbath at 200 degrees F., the specimens are allowed to cool in a dessicator and are tested in a specially designed impact machine. The test consists in allow-

tions of traffic, and in order to correlate the results of these tests with the behavior of the material in service, it is necessary to have a knowledge of similar material under service conditions.

Experience shows that, in general, the following limiting values for laboratory tests may be used in determining the value of a rock for road building when taken in conjunction with previous service behavior of a similar material:

Table of Limiting Values.

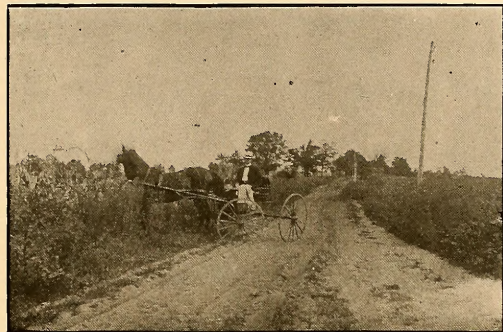
| Character of Traffic | Results of Tests | | |
|----------------------|------------------|------------|------------|
| | Per Cent of Wear | Hardness | Toughness |
| Heavy..... | 3.5 or less | 18 or over | 19 or over |
| Medium..... | 3.5 to 5 | 14 to 18 | 14 to 19 |
| Light..... | 5 to 8 | 10 to 14 | 8 to 14 |

The cementing value should in general run above 25 for all classes of traffic, except in specific cases, as noted below.

PHYSICAL CHARACTERISTICS OF ROAD BUILDING ROCKS.

Trap.

The trap rocks including the usual varieties of diabase basalt, andesite, diorite and gabbro are particularly well suited for roads subjected to heavy teaming on account of their high resistance to wear, hardness and toughness. They bind well on the road provided the traffic is heavy enough to supply by wear enough fine material to replace that lost by natural causes. As a whole the traps are better suited for the



Stretch of Bad Sandy Road Near Abbeville, Alabama

ing a 1 kg. weight to fall through a height of 1 cm. on a flat end plunger which rests on the specimen. The number of blows required to destroy the specimen is taken as the cementing value of the material. Below 10, the cementing value is called, low; from 10 to 25, fair; 26 to 75, good; 76 to 100, very good; above 100, excellent.

Absorption.

The absorption is obtained by immersing a small sample, weighing about 10 grams, in water for four days, noting the gain in weight during that period, and finally expressing it in pounds of water absorbed per cubic foot of solid rock.

Interpretation of Laboratory Tests.

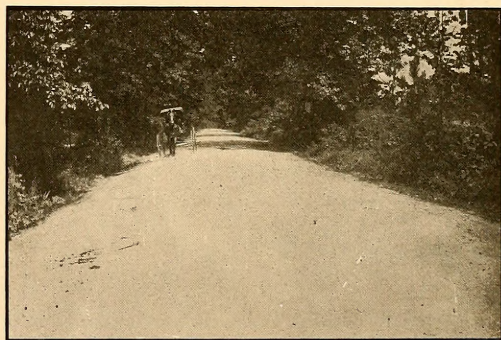
The following facts should be taken into consideration before attempting to interpret the results of the laboratory tests on samples of rock intended for use in macadam road construction, viz: 1. The character of the traffic to which the material is liable to be subjected, whether (a) automobile, or (b) horse-drawn and if so, whether (1) heavy, (2) medium, or (3) light. 2. The character of the material under examination, that is, (a) its name, and (b) its approximate mineral composition and structure. 3. The behavior of material of a similar nature in actual service.

A knowledge of these three points is essential to an intelligent interpretation of the laboratory tests in any specific instance.

1. Character of Traffic. Waterbound macadam, in general, is not practicable where much automobile traffic exists, but is only suitable for horse-drawn travel. Assuming the traffic to be principally horse-drawn, it is well to know whether it is heavy, as in the vicinity, of large cities; medium, as on the principal highways; or light, as on park or less important country roads.

2. Character of Material. In order to compare a material under test with similar materials in service, it is of value to know the name and character of the specimens.

3. Behavior of Similar Rock in Service. Laboratory tests can do little more than approximate the condi-



A Nearly Perfect Piece of Sand Clay Road near Selma, Ala., Built by a Competent Engineer.

construction of macadam roads subjected to moderately heavy traffic than any other road making rock.

Limestones and Dolomite.

Limestones as a rule are not very hard or tough but possess a good cementing value and show low-medium resistance to wear. Limestones are therefore not suited for the construction of waterbound macadam roads which are subjected to very heavy traffic, since this class of traffic will wear away such a road too quickly. For the construction of roads subjected to light or medium-light horse drawn traffic, however, limestone is a material which is also ideal.

Limestones in their physical characteristics are very much alike, although the crystalline limestones are least suited for road building because of their low

toughness, which property renders them liable to fracture under the impact of traffic. The indications are that the siliceous limestones are those best suited for macadam construction.

Granites.

The granites are generally lacking in toughness and binding power, and are therefore unfit for use as a class in any but the foundation courses in macadam roads. Although they sometimes show good cementing qualities in the laboratory, particularly the material which is highly altered, experience has shown that it should not be used for surfacing on account of the ease with which it disintegrates under traffic.

Sandstones.

Sandstones are extremely variable in their physical characteristics. Some of them are hard and tough, while others are very likely to fracture under impact. As a class they do not bind well in the road, and for this reason they should be used only for the foundation course when their hardness and toughness is sufficient to warrant their use for this purpose.

Chert.

Chert is a very hard material and usually shows good resistance to wear. It makes excellent material for the construction of macadam roads, as it invariably binds together well.

Gneiss, Schist and Slate.

Gneiss, schist and slate are very unsatisfactory materials for road construction because of their foliated structure which renders them extremely subject to fracture under impact. They should not be used in road construction when a better material is available.

Marble and Quartzite.

Neither marble nor quartzite is of much value to the road builder for the wearing courses of macadam roads. Marble, on account of its crystalline structure, is lacking in toughness, while quartzite is a poor road material on account of its extreme hardness and lack of binding power.

Character of Rock For Bituminous Construction.

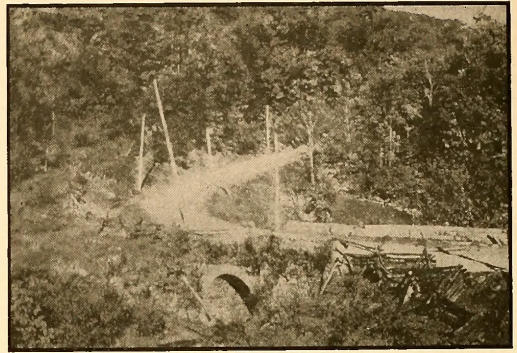
Bituminous binders afford great protection to the stone in bituminous construction, when the road is properly maintained with a surface paint coat of bitumen. The surface mat and the bituminous binder between the stones prevent the grinding up of the stone portion of the wearing surface and likewise reduce the effect of shock or impact on the rock in the body of the road. It seems to be a fact that stone which is so low in hardness and toughness that it cannot be used in waterbound macadam, may be used with perfect success in bituminous work. The bituminous binder renders it possible to use many rocks, such as sandstones, schists, quartzites, marble, etc., which do not bind or are too friable for the construction of waterbound work. Although some rocks crush up into fragments whose sides are too smooth to offer a perfect bond for the bitumen, it is probably true that almost any rock which will not crush up too much under the roller is suitable for use with a bituminous binder.

Gravel.

The term gravel, as applied to road building is one which has different meanings in different sections of the country, and conflicting ideas seem to exist as to what class of material should be included in the term. Thus, what in parts of the country would be called coarse sand, would be termed gravel in other sections. Again the word is sometimes made to include material

ranging from the finest particles to the coarsest shingle and boulders.

From the standpoint of the road builder gravel should be composed of the products of rock disintegration ranging in size from finely divided clay up to



A Section of the Old Cumberland Pike Near Frostburg, Md., Showing One of the Many Fine Stone Bridges on the Road

the largest pebble which may be used in construction, which in general, should not be greater than two inches in largest dimension.

In the selection of a road building gravel there are several very important characteristics which should be investigated, and these are:

1. Character of rock composing the fragments.
2. Shape of the fragments.
3. Relative grading of the different sizes of particles.
4. Amount and character of the finely divided or binding material.
5. Cementing qualities of the material.

1. Character of Rock Composing the Fragments.

Just as in the case of the waterbound macadam road, the durability of the wearing surface of a gravel road is dependent in part on the hardness and toughness of the stone of which it is constructed. Gravel being composed of waterworn or glacial-worn rock fragments, is made up of various types of rocks some of which are not entirely adapted for road construction because of the ease with which they grind up under traffic. Thus the limestone and sandstone gravels, and those composed of micaceous fragments are less durable than those made of fragments of trap or granite. Laboratory inspection of gravel should therefore include a determination of the character of the fragments composing the sample, and this in most cases may be done by a superficial examination of a sufficient number of particles fractured for the purpose.

2. Shape of the Fragments.

The shape of the pebbles should be considered since it is doubtless true that fragments of angular character furnish a more effective mechanical bond than do rounded pebbles, and where a choice lies between two gravels equal in other respects, the sharper, more angular particles should be given the preference.

3. Relative Grading of Different Sizes of Particles.

Gravel which is graded in size so that the smaller pebbles fit into the interstices between the larger ones, is much denser and more stable in the road than that which is composed of all fine or all coarse material. Graded in this way, gravel requires much less binding material and presents a more durable wearing surface

which is less likely to ravel or become muddy and dusty than that in which more fine binder is required.

To determine the grading, a sieve or mechanical analysis is made. This is done by passing a dried sample of the material through sieves of different sized mesh and determining by weight the amount retained on each. The sieves in use in the office of public roads, have circular openings of the following sizes: 2 in., $1\frac{1}{2}$ in., 1 in., $\frac{3}{4}$ in., $\frac{1}{2}$ in., $\frac{1}{4}$ in., $\frac{1}{8}$, and those with 10, 20, 30, 40, 50, 80, 100 and 200 meshes per lineal inch. Sieve analysis furnishes a means of judging whether the gravel might be improved by screening out the fine material or perhaps by combining it with material from another source to give it a more uniform grading. It is a useful test in judging the presence of too much sand, which might have the effect of creating a loose unstable road surface.

4. Amount and Character of the Binding Material.

The binding material in gravel, as a rule, may consist of the powdered rock itself, or clay, loam, iron oxide, silicon, etc.

Clays are of variable binding qualities and a very quick rough determination of the binding power may be made by moistening quite a small amount of clay between the fingers and noting whether it has a sticky or gritty feeling. The sticky or fat clays are of good cementing qualities. Ferruginous clays are very good binders and, invariably, gravel containing fine material of this character cements together exceptionally well on the road. If the stones composing the gravel grind up into dust which is high in cementing qualities, this dust makes the best kind of a binder. It is for this reason that trap rock gravels make such excellent road materials since they possess cementing qualities as well as durability.

Gravels composed of poor binding materials, such as quartz, sandstone, granite, etc., must always have binding material mixed with them in amounts not to exceed about 10 to 12 per cent. It is far better to have

too little than too much binder, since much fine material will be formed through the grinding of traffic.

The amount of binder in a sample of gravel may be obtained by washing out the fine material, evaporating the wash water to dryness, and weighing the residue which may be considered as cementing material.

The cementing value of the binding material is obtained by grinding it with water in a ball mill, forming it into briquettes and subjecting it to the impact cementing test as practiced on crushed rock samples.

A preliminary investigation of road materials, by means of laboratory tests, furnishes information of great value to the road builder. From the test results not only can judgment be formed regarding the probable suitability of the material for the purpose intended, but the relative worth of a number of samples can be determined, thus rendering it possible to make a more economic selection of rock or gravel from several available sources of supply.

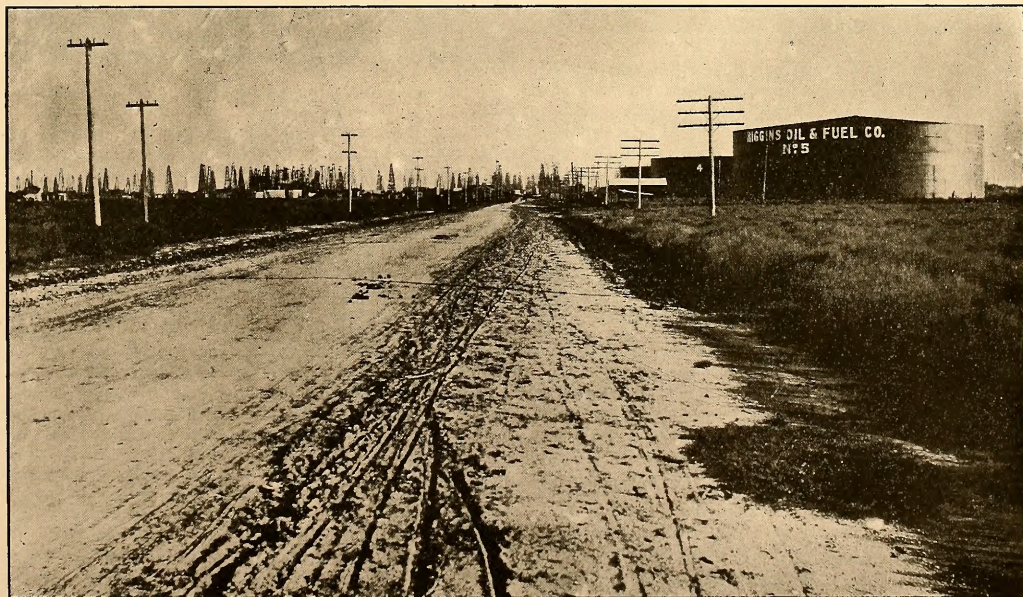
It is announced by the Texas Business Men's Association that during the first six months of 1914 road bonds have been carried in Texas in 51 elections out of 73. The total amount issued is \$6,581,500, which lacks only \$715,000 of equalling the record for the whole of last year.

A boost for good roads is bread cast upon the waters.

Hillsboro county, Fla., has been asking for bids on 252,300 square yards of brick pavement and 382,994 linear feet of concrete curb.

Williamson, W. Va., will construct 50,000 square yards of brick, bituminous macadam and concrete pavement.

Texarkana, Ark., will construct 8,000 square yards of concrete pavement.



Shell Road near Beaumont, Texas, built under the direction of the U. S. Office of Public Roads

Sand Clay Roads in Virginia

*By F. D. HENLEY

Engineer Virginia State Highway Commission, Richmond, Va.

THERE are several counties in this and other states where it is claimed the first sand-clay or soil road was built, and as they were all probably built by different men it is impossible to give credit to the originator. Undoubtedly many miles of sand-clay road were built by nature and the elements centuries before man discovered the process, which was only a few years ago; however, if that man could be found, the people of this country should erect a handsome monument to perpetuate his memory. To the people of eastern Virginia I would suggest that a very appropriate monument would be to build a system of sand-clay roads in every county, connecting with the systems in the adjoining counties. During the past few years there has been so much written and said about road building, and especially sand-clay roads, that, to a gathering of road builders, what I shall have to say will probably sound as "an oft told tale," nevertheless we will discuss some details that have by actual experience proven useful.

For convenience, we will consider the several operations under the following general headings, in the order named:

Equipment, Materials, Mixing, Shaping, Cost and Maintenance.

An ideal equipment for one force, in my opinion, consists of sixteen to twenty mules, one six horse grader, one two horse grader, one rooter plow, one four horse turn plow, two 2-horse turn plows, about seven-wheel and drag scrapers, one wagon with slat body to each two horse team, one heavy Disc Harrow, one plank or split log drag for every four or five miles of road, one spike tooth drag and hand tools, such as picks, shovels, etc. An equipment of this size will cost about \$6,000, and depreciates at the rate of about 15% per year.

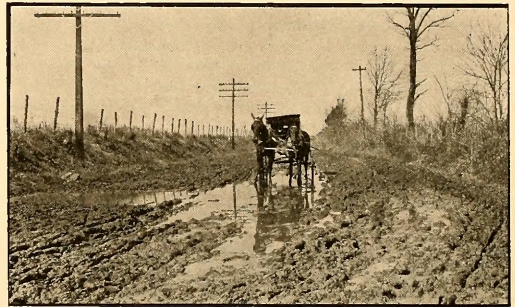
Two foremen and twenty to thirty laborers are usually required to operate this equipment, and the cost per month will average about \$1200 to \$1500. Where convicts are used the cost to the county is equal to about one-half of this amount. A force of this size will build from one to three miles of road per month.

Materials.

As the name implies, sand and clay are required and the coarser the sand and the more tenacious the clay the better the results. In some instances both elements are found in road bed, and with this condition it is only necessary to mix the two and shape the road. In other instances it is necessary to haul either sand or clay on to road bed and mix with material in sub-grade, and some conditions require both sand and clay to be hauled. On sections of road where drainage has been poor for a long time it is always advisable to haul both sand and clay. Whenever a natural mixture of sand and clay in the right proportions can be found it is advisable to use this for surfacing in preference to hauling either sand or clay separately. When the last mentioned method is adopted we designate it a "top soil" road. This type of road is being built in a great many counties of Piedmont Virginia, and is giving

general satisfaction. The top soil road is a very near relative of the gravel road, and, as a matter of fact, is a gravel road in which the gravel is either small in size or percentage. As no rule has been formulated for determining the size or percentage of gravel in a gravel road, I would suggest that a more appropriate name for a "top soil" road would be a "No. 2 gravel road."

The two elements, sand and clay, in the proportion of 75 to 85% sand and 15 to 25% clay should be thoroughly mixed until of uniform color. For the best results only sufficient clay to fill the voids between the sand grains should be used, the clay serving as a binder to prevent the sand grains from moving under traffic. In farmers Bulletin No. 311 issued by the U. S. Department of Agriculture, Office of Public Roads, the following method is suggested to roughly ascertain the per cent of voids in a given sand. Take two vessels of same dimensions, fill one with sand and the other with water, pour water into sand until it reaches the point of overflowing. The amount of water poured



A Pleasure Drive over a road in Spotsylvania county, Virginia.

into the sand represents practically the amount of clay required and this may be reduced to percentage. On sections of road that are not exposed to the sun and wind, as in a dense woods or deep cut, or on low, boggy sections, a very small percentage of clay is required, as water will partially fill the voids between the sand grains. On heavy grades, especially when exposed to the sun and wind, the percentage of clay should be greater than with any other condition.

The turn plow and disc harrow are, in my opinion, the best implements for mixing, being both economical and effective. When both sand and clay can be secured from one pit on a haul that is sufficiently long to justify the use of wagons, the sand and clay may be partially mixed in the wagons, regulating the percentage by the number of men shoveling the two materials. For instance, as many as four or five men may be used shoveling sand and only one shoveling clay. The depth to which material to be used for surfacing is plowed is often a detail of importance. For instance, if the available surfacing material is deficient in clay and there is a clay subsoil not more than six or seven inches below the surface, the depth to which plowing is to be done can be so regulated that just a sufficient amount

*An address delivered before the Richmond Convention of Virginia Road Builders' Association, Feb. 10-11.

of clay will be turned up to give the proper mixture. The material can then be moved by wheel scrapers or wagons, and after it is dumped on the road, spread and shape no further mixing is necessary. This method has proven economical and very satisfactory, especially where wheel scrapers are used for moving the material.

The sand-clay mixture should be eight to twelve inches in thickness at the center and run to a feather edge at ditch line, and twenty to twenty-six feet in width, depending on the traffic and local conditions. In roads built as above described the crown is made altogether of the surfacing material.

Shaping.

Unless the surfacing material has been thoroughly mixed before being dumped on the road, the sand and clay should be spread before mixing to roughly conform to the proposed finished cross-section, which should be not less than three-fourths and not more than one inch to the foot, with side ditches somewhat deeper than for macadam. After mixing, surface should be re-shaped and brought to a true smooth cross-section with road grader, tooth and split log drag; and kept in shape until the mass has become thoroughly consolidated. Good results cannot be had unless all noticeable inequalities are worked out at the time surface is bonding or "setting up," as travel over the road tends to magnify the depressions, and the bumps, on account of depressions forming on each side, appear to grow. If at this time it is discovered that an excess of clay has been used in the mixture, which would be indicated by the surface "picking up" or sticking to the wheels of vehicles during wet weather, a thin layer of sand spread evenly over the surface will remedy this fault. If in dry weather the surface begins to break up, which indicates an excess of sand, it is advisable to add clay and thoroughly mix, which necessitates breaking up the surface. I have observed that there is a tendency to use too little clay. An excess of clay can be easily overcome by sand applied as a top dressing, while it is necessary to break up the surface in order to apply clay, and for this reason it is, in my opinion, a greater fault to use too much sand than too much clay in a mixture, especially if there is an abundance of sand convenient.

The sand-clay or soil road should not be considered completed the first time the surface is put in good shape, as bad sections often develop after the surface has been in shape for as long a period as one year. The real tests for the sand-clay road are the protracted droughts and the long-continued, slow, dribbling rains, followed by freezing. The last mentioned condition is very trying on sand-clay and soil roads and the best constructed road will very probably require some attention after such weather. If the road has been properly constructed, a split log drag used at the right time will put the surface in good shape.

The use of a roller on this class of road is not necessary, and may be a decided disadvantage. The surface should, like a wound in the flesh, heal from the bottom. It is not practical to lay surfacing in more than two courses, and use of the roller case-hardens the surface, and this case-hardened surface will often carry the traffic until the first protracted wet or dry spell of weather, when it will cut through or break up. While this probably would not be a permanent injury to the road it would certainly be very inconvenient to the users of the same.

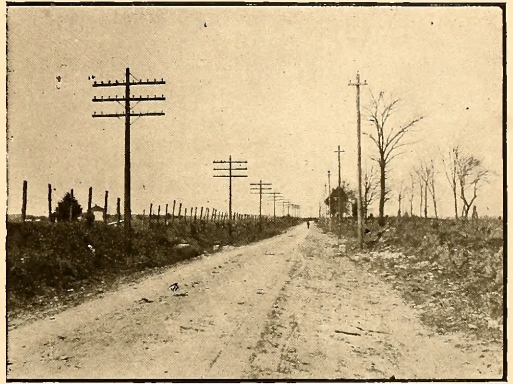
Cost.

On account of the great variance in local conditions, it is impossible to set one price for sand-clay work.

However, I would say, that under the most favorable conditions, a fair sand-clay road may be built for about \$400 per mile, and when built under adverse conditions may cost as much as \$160 per mile. The Seventh Annual Report of the State Highway Commissioner shows that about 270 miles of sand-clay road were built during the fiscal year ending Sept. 30, 1913, at an average cost of about \$885 per mile.

A great many of the unimproved roads appear to have been located for the purpose of draining the adjacent lands rather than for road purposes, and it is needless to say that roads thus located should be changed, even at an increased cost; however, it is more often that a large saving may be thus effected on account of a reduction in the amount of surfacing material to be hauled. A greater depth to surfacing material is usually required in a cut than elsewhere, as very rarely suitable surfacing material for a sand-clay or soil road is found more than a foot or two below the surface of the ground.

Dr. Pratt in his address yesterday stated that sand and clay had in a few instances been shipped by rail in



The Same Road after the Wonder-Workers of the U. S. Office of Public Roads got through with it.

North Carolina for road surfacing and at a large saving in cost over other types of construction. I do not think this has ever been done in Virginia, and in that portion of the state with which I am familiar I would not recommend building the sand-clay or soil road unless these materials could be found locally. If it is necessary to ship surfacing material I would recommend the gravel (or possibly the macadam road if in a section financially able to build and maintain the macadam), as with our conditions I do not believe the gravel road would be much more expensive than the sand-clay, and would be well worth the difference in cost; but on roads that do not carry a very heavy traffic, and where gravel or (with the above modification), suitable rock for macadam, cannot be had locally, I would recommend the soil or sand-clay road. Some of the advantages are:

- 1st. Cheapness in cost of construction.
- 2nd. Cheapness and simplicity of maintenance.
- 3rd. Saving in horses and vehicles, being much easier on horses than hard surfaced roads, and for this reason many persons prefer the sand-clay road to the water-bound macadam, regardless of the greater amount invested in the latter.

With a few exceptions the roads that have been improved with sand-clay or soil would not have been im-

proved for many years to come, and possibly never, with a more expensive construction; and in sections where the sand-clay road has been built the large increase in taxable values will probably provide a sufficient fund to resurface with as good or a better material within a few years, if necessary.

Maintenance.

Someone has aptly said that the maintenance of any class of road should commence on the same day that the work of construction is discontinued. This is certainly true of the sand-clay road, especially if the day of completion happens to be a wet one. As intimated before, I do not think the the maintenance charge of this type of road should commence until it has been thoroughly tested by extreme wet and dry weather, and often a whole year is required to do this, but call it maintenance, construction, or what you please, the road should be what I would term "nursed" for at

least one year after it has been first put in shape, as the best of them will be made sick by protracted wet or dry weather, and sometimes both.

The road grader and split log or plank drag are the most useful implements for the maintenance of sand-clay or soil roads. I would not recommend the use of the patented adjustable drag except by a skillful operator. The split log or plank drag is absolutely "fool proof," which is a great advantage.

I cannot find any reliable cost data for the maintenance of soil or sand-clay roads, but would approximate the cost per mile per year to be about \$30.

In conclusion, I would say that in my opinion, the engineer who supervises the construction of a sand-clay or other type of road should also supervise the maintenance of same. He would thus have an opportunity to observe his mistakes and would doubtless learn many valuable lessons in construction.

Concrete Roads For Texas

By R. C. STUBBS, Dallas, Texas

Nothing is more important to a city than the roads that lead to it. No city on the globe is more certainly in the spotlight than is Dallas. Industrially, financially, prospectively or from any point of view no city has greater promise of rapid increase in population and commercial importance than Dallas.

Trains on faster schedule enter Dallas, more interurbans enter Dallas, than any other city in the south. It is important that our highways be in keeping with other improvements, and as inviting to the traveler. It is not enough that gravel, macadam, or dirt roads lead to the metropolis of the great state of Texas when oth-

that this yardage will be doubled in 1914. This is only one of many examples. It is enough to know that at the beginning of this year there was more than 14,000,000 yards of concrete roadway giving service in this country. Contracts and reliable reports at this time indicate this yardage will be no less than 30,000,000 yards before the end of the year.

Properly placed concrete is pronounced by the government to be the most permanent pavement known, and for that reason is the best investment that can be made for this purpose.

It must be admitted that a road material that served the purpose a few years ago may not suffice today, so rapid has been the change in motive power and vehicles, to meet the demands of modern rapid transportation. The ingenuity of man has kept pace with the situation supplying agents with which to convey increased tonnage, and all that remains at this time is for the road builder to employ improved road paving material.

Many interesting facts appear when we begin investigation of this important subject. Following are facts that can be verified by any one familiar with rural road travel. These figures are derived from 300 carefully made tests in Dallas, Collin, Rockwall, Hunt, Grayson, Tarrant and Navarro counties, at fair test points on different roads, and are regarded as being conclusive:

That traffic on all roads more than three miles from a city or one mile from a town, uses the roadwidths about as follows:

Ninety-five per cent is confined to 12 feet of roadwidth.

Eighty-five per cent is confined to 10 feet of roadwidth.

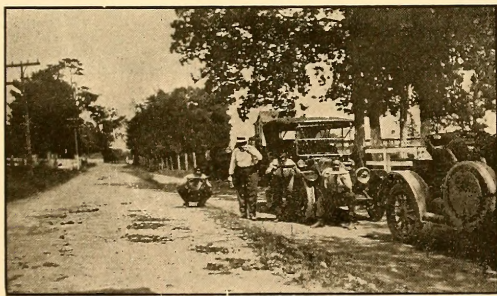
Seventy-five per cent is confined to eight feet of roadwidth.

Fifty per cent is confined to practically same rut.

This combination of reasons, cause and effect, has made me to believe that all roads should be built of two materials; one a permanent strip in the center, the other a less costly ballast on either side thereof to act as a relief to vehicles in passing.

This strip must be able to withstand the following kinds of traffic as I believe it to be:

Horse teams, single and double, all gaits.



Showing the condition of the Louisville and Nashville Pike before it was resurfaced

er towns of less importance keeping up with the times by building modern roads that reach far out into the commonwealth, and even to adjoining cities, of materials considered the last word in progress.

I made some suggestions eight years ago at a convention of the National Association of Cement Users in Chicago, at which time I proposed a metal center road. I was considered radical in that day, nevertheless the telling of time has seen a steady increase in concrete road building in this country. Twenty-eight states have adopted concrete as the standard of permanent road paving, and the increase in yardage has been accelerated with time; 1913 yardage was more than twenty times that of 1912. California laid 80,000 yards in 1912 and 1,765,000 in 1913, with present indications

Heavy loaded, narrow tired wagons, moving slow.
High speed automobiles.

The abrasive force of the average horse foot upon a road or pavement, measured when the animal is walking, and again when trotting, the latter test will prove several times the more destructive, due to the fact that the entire weight of the horse is plunged forward in the form of a blow, which action is very rapid and with a sliding or driving forward motion with tendency to loosen the surface particles of the pavement.

Traffic of this character must necessarily move slowly, by reason of which deep ruts are cut in a soft pavement, and are trying upon hard pavement, by grinding if possible the surface particles, causing same to ravel if such pavement is not placed with exceeding skill.

It will be understood that about all cars are high speed cars when driving on country roads. Damage is done by the tire drawing out of the surface all loosened particles, casting them away in clouds of dust.

Not long ago we only had the two first named kind of traffic, and loosened particles were permitted to remain upon the surface. Now that we have the automobile and the auto-truck we must advance our standard of road building, if we are to benefit by this greatest of all modern improvements in rural travel and commercial transportation, making possible the marketing of farm products in keeping with the demands of today.

I suggest the "metal center" because to pave the entire proposed paved portion of the road with superior concrete would run the cost beyond the bonding

limit, while to use a material that is sufficiently economical over the whole road surface, same will not be able to withstand the rutting of traffic and is in too many cases proving a waste of money.

Some other states have gone faster than Texas in permanent road building, but it is encouraging at this time to note several counties are contemplating concrete road construction in Texas, and if proper care is taken, of which there is little or no doubt, it will not be long until we will lead the world in this.

Congratulations to commissioners who investigate for themselves.

Concrete metal center road should cost little more than high grade macadam, and should last ten times as long, at one-tenth the expense of upkeep.

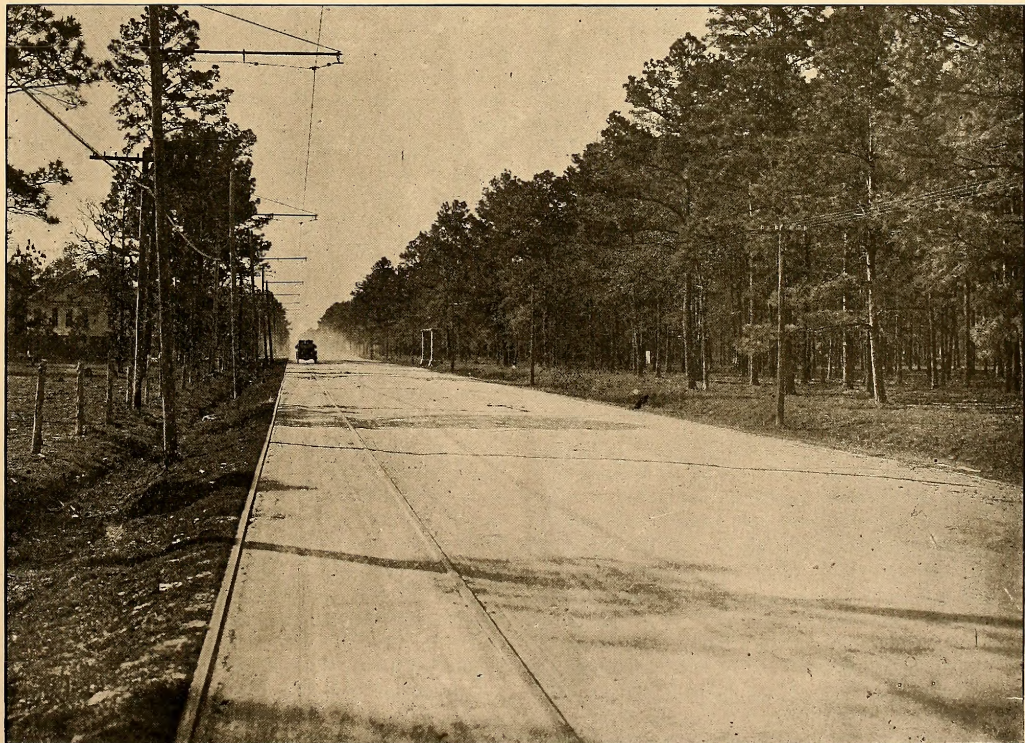
The Maryland State Roads Commission is asking for bids on a bridge 2300 feet long over Middle Branch in Baltimore.

Walker county, Ala., having available for road work \$212,000, will grade 500 to 800 miles of road.

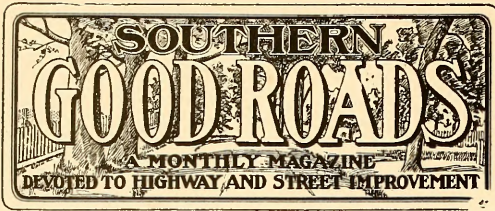
A bridge is to be built across the Ohio river at Parkersburg, W. Va., to cost \$430,000.

El Paso county, Tex., will spend \$100,000 on asphalt macadam road.

Miami, Fla., is asking for bids on 55,000 square yards of pavement.



The Harrisburg Road, near Houston, Texas, a fine sample of the Harris county Mud Shell Roads.



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VOL. X. SEPTEMBER, 1914. No. 3.

ROADS AND WARS.

The great war now in progress in Europe serves to show the wonderful value of good roads when large bodies of troops are to be moved. Because of the fine roads in Germany and France and through Belgium, the German army, being prepared for immediate action, pushed across the line into French territory, and at last accounts was only 60 miles away from the French capital.

East of Germany lies the great Russian empire, with its 20,000,000 soldiers, ready for active service against Germany, but hindered by the worst roads in Europe. If the gigantic army of the Czar had been able to move as quickly as the German forces moved, the Germans would not have been clamoring at the gates of Paris, but would have been engaged in life and death struggle around the fortifications of Berlin.

There is a lesson in this that all nations should heed. Along the troublesome Mexican border of the United States, where insurrections are likely to occur at any time, there should be a system of fine, broad, military highways, along which troops might be moved easily and speedily at any time.

Congress should take action on the proposition to establish a highway along the Rio Grande to be known

as the "National Military Highway." A live working organization, headed by Mr. Mason Maney of Pear-sall, Texas, is behind the proposition. The European war should furnish Mr. Maney and his associates some very fine and convincing arguments.

BROADENING SCOPE OF ROAD CONGRESS.

The aim of the men backing the Fourth American Road Congress, which is to be held at Atlanta, Ga., during the week of November 9, is to make it the greatest meeting of its kind ever held on the American continent. The congress is being planned on a big scale and it will touch every phase of the road-making business from the smallest road official, the township supervisor, up to the heads of the national Office of Public Roads. The congress will prove equally helpful to the humble supervisor and the learned highway expert.

Announcement is made that a conference of the official heads of the various State Highway Departments and of the United States Office of Public Roads, will be held at some time during the course of the sessions to consider questions of mutual interest to the highway departments. A number of the states have gone extensively into the building of trunk line systems through large bond issues, notably New York, with an actual and contemplated outlay of \$100,000,000; California, with \$18,000,000; Massachusetts about \$14,000,000; Maryland, actual and contemplated about \$18,000,000, and other states in smaller amounts. The methods followed and the results obtained will be carefully analyzed. Other states, among them Virginia, Georgia, Colorado and Washington have gone extensively into the use of state convicts for road work. The states of New York and New Jersey are now experimenting along these lines while many others are studying the problem. Convict labor will, therefore, be another one of the many subjects discussed at the congress. The general program which has just been issued, carries the names of twenty-six chief officials of Highway Departments representing the states of Maine, New Hampshire, Connecticut, New York, Pennsylvania, New Jersey, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Alabama, Louisiana, Arkansas, Oklahoma, Kentucky, Ohio, Michigan, Illinois, Minnesota, Iowa, Colorado, Washington, California and the Federal Government. It is expected that by the time the final program is issued, not more than one or two states will fail to be represented by the actual official heads of their highway departments. These technically trained specialists will deal with all of the problems of construction, maintenance and management of public roads.

Dr. Joseph Hyde Pratt, state geologist, head of the North Carolina road work and one of the editors of this magazine, will present a paper on "Educational Field for Highway Departments."

The congress, which is held annually under the auspices of the American Highway Association and the

American Automobile Association, grows in importance every year. The 1913 congress, held at Detroit, broke all records for attendance, completeness of program and magnitude of exhibits. Southern Good Roads predicts that the 1914 congress will surpass the Detroit gathering. The Sunny South is deeply interested in good road improvement and the attendance will be very large. Atlanta is a great convention city and will take care of the thousands of visitors expected in the very finest style.

LOWER COUNTRY SCHOOL ATTENDANCE WHERE ROADS ARE BAD.

Census reports show that in 1909 there were 24,000,000 children in the United States of school age, but that only 17,500,000 were enrolled in the public schools. This would indicate that there are several million children who are deprived, for one reason or another, from obtaining an education, and there is no doubt that a large number of those are prevented from attending school on account of bad roads. Furthermore, many schools in the country districts are closed for varying periods on account of the impassable conditions of the roads, and many of the schools which are not closed have a nominal percentage of attendance.

While it is true that various factors contribute to increase or decrease the attendance at schools in given sections of the country, it is worthy of comment that in the states having a high percentage of improved roads a much larger percentage of the students enrolled, regularly attend the schools than in the states having a small percentage of improved roads. In five Eastern and Western states which have a large mileage of improved roads, the average attendance of enrolled pupils in 1908-9 was 80 per cent; while in four Southern states and one Northwestern state which are noted for bad roads, the average attendance for the same year was 64 per cent—80 per cent in the good roads states as against 64 per cent in the bad road states. In the states first named, 35 per cent of the roads have been improved, while in the latter group of states there are only 1-2 per cent of the roads improved.

That improved roads should benefit our country school system, there would seem to be no doubt. Improved roads make it possible to consolidate or centralize the schools and to establish graded schools in rural communities. Such schools centrally located will accommodate all of the children within a radius of four or five miles. In many communities having the advantage of improved roads, commodious buildings have been provided, more competent teachers have been employed and modern facilities for teaching have been supplied at a minimum cost. For instance, since the improvement of the main highways in Durham county, North Carolina, the number of school houses have been reduced from 65 to 42, of which 17 are graded, and have two or more rooms, and employ two or more teachers.

There are at the present time about 2,000 consolidated rural schools in the United States. It appears that Massachusetts, Ohio and Indiana have made the greatest progress along these lines, and it is rather significant to note that in these states about one-third of the roads have been improved. According to statistics of the Agricultural Department, there was expended in 1899, \$22,116 in Massachusetts for the con-

veyance of pupils to consolidated schools, but in 1908 the expenditure for this purpose amounted to \$292,213. In Indiana, the expenditure for this purpose in 1904 amounted to \$86,000, while in 1908, \$290,000 was expended. This expenditure for transportation reflects in a general way, the extent and progress of this new educational movement. It must not be understood that this is an additional burden, as the expenditure thus made is saved in other directions—that is by the decrease in the number of schools and economy in their operation.

In Indiana, Massachusetts, Ohio and other states, the one-room, one-teacher schools are being replaced by central school houses, with half-cozen rooms and as many teachers. Wagons are sent out every day to gather up the children and to take them home again in the evening. All of the children within a radius of several miles are thus provided with the most modern school facilities. In some of these schools, courses in manual training, agriculture and home economics have been introduced, scientific apparatus utilized, and teachers having special qualifications and training employed.

Trusting Convicts vs. Beating Them.

Trusting men, instead of beating them, were contrasted at the annual meeting of the National Committee on Prison Labor, held at Heather Dell farm, the home of Adolph Lewisohn, near New York City, June, 20.

The National Committee heard of the magnificent highways which prisoners are building, miles away from any prison building, guarding themselves and taking pride in their work. They heard also that this honor system is not in use in many prisons, and cases were cited of cruel punishments inflicted in the last few weeks which degrade the prisoner so that he never can be fit for free life. A strong appeal was made at the meeting against capital punishment, based in part on its futility to prevent murder and its civil effect on prison work.

The injustice of the sentences imposed by many judges was referred to, and a plea made for sentences which shall be absolutely indeterminate. It was shown that the first need of the prisoner is for scientific examination, mental and physical, and the application of measures to overcome his defects. Then he should be assigned to some industry which will develop what ability he has. Finally his release should come after he has proved, both by his skill in labor and his conduct in prison, that he can be freed without danger of a speedy return to the prison.

The slavery of the prisoner was held to lie at the root of all the evils of our prison system. The committee is endeavoring to break down this slave system by securing wage for the prisoner, and to this end is conducting a case to test the status of the prisoner before the courts of the state of Rhode Island, the constitution of which prohibits slavery without exception as to punishment for crime.

The work of the committee during the past months has grown to be of such magnitude and is covering so many lines of activity that it was decided to change the name to national committee on prisons and prison labor. Under its new name the committee will push with vigor its campaign against the contract system of prison labor and for the upbuilding of the prisoner through fair treatment, fresh air and sunshine, and incentive to do the best that is in him.

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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This page will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this page should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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Concerning road building activities and road-building needs of this state, Dr. Joseph Hyde Pratt recently gave out an interview from which the following extracts are taken:

"The most notable fact at the present time about road conditions in North Carolina is that there is a great desire among most of our citizens for good roads for themselves as well as their neighbors. It is shown very clearly by the 104 acts relating to bond issues for building roads passed by the legislature of 1913," said Mr. Pratt. "One act was passed which applies to all the counties in the state except four, which allows townships to vote on bonds up to \$50,000 upon petition of one-fourth of the qualified voters of said township to county commissioners.

"There is little method or system in the working of these acts as regards the methods of election; the provision for competent and disinterested men to act as a highway commission for spending the bond money, or requiring the services of a highway engineer to take charge of road work.

"Since the passage of these acts, 19 counties and 45 townships have voted \$3,832,000 in bonds for road improvement. In addition to these funds, there is a tax levy in nearly all of the counties of the state of about \$2,115,000 annually; also there are 70 counties which have a labor tax to which 125,000 men are subject, who work on an average of 5 3-7 days each year, making a total of 679,000 days of free labor. Further there are about 1,500 county convicts worked on the roads. This makes approximately \$6,628,000 in money and labor which we have had to spend on our roads during 1913. More than \$3,000,000 of the bond issues have not yet been spent, but are being spent, and, in many cases, without proper supervision. So that we are building our roads without system in most cases and without skilled helpers. In but few counties is there any system in the location of the roads, and some of our best counties are using expensive surfacing materials on roads which are not properly located."

* * *

Good Roads in Mt. Airy Township.

A dispatch from Mt. Airy brings the news that fine progress is being made in Mt. Airy township in road construction this season and the fall will see all of her main highways converted into first-class standard roads. Smyth and McSweeney, who contracted for 25 miles of road to be completed this summer, have finished about ten miles and if they have open weather,

will easily complete their contract before Christmas. They have turned over the White Sulphur Springs road to the Highway Commission for the sand-clay and are now working the Low Gap road to the township line. After the completion of this road the force will go to the Old Hollow, which leads toward Pilot Mountain.

In the past three years the township has built and sand-clayed nearly 30 miles of highway, all of which is equal to any in the South, every foot of it being of standard width, a first class grade and has stood the test of a hard winter. From a special tax and bonds \$120,000 has been raised for road improvement and it is calculated that this will put every road in the township in first-class condition.

While the township has been busy building good roads the city has not been idle, for since last fall it has built more than a mile of first-class Tarvia street and still has a large force of hands at this work. Every street improved was constructed under a new survey with new curbing of Mt. Airy granite. It is proposed to complete Franklin avenue to the depot and open up a new street to the new passenger station which will be open to the public in a few weeks. With the seven miles of granolithic sidewalks these new streets add much to the appearance of what has a right to be called the "Granite City."

* * *

The Roads of Wake.

Mr. D. H. Winslow, engineer U. S. Office of Public Roads, passed through Wake county recently and was very favorably impressed with the road improvement going on in that county. He wrote a letter to Mr. John A. Mills, chairman of the board of county commissioners, praising the county for the good work being accomplished. Among other things he said:

About six years ago I came through Wake county and examined the road construction at that time. During the last two years there has been more progress on the roads of Wake county than in the previous twenty years. There is also a marked improvement in the construction of the bridges and the figures furnished me show that these bridges are being built at an exceedingly low cost. The subject of maintenance is one which is also receiving marked attention and Wake county is trying out at the present time the patrol system, patterned after the method adopted on the famous roads of France. The taxpayers would do well to consider that the dollar does not go as far

today as it did ten years ago. Labor is higher, teams are higher and feed is higher, so that for a small appropriation as great results cannot be obtained. It is also well to consider that we use our roads a great deal more than in the past and like anything else the more an article is used the more rapidly it wears out. This is true of any type of pavement from common earth road to the highest type of road known to modern engineering science.

* * *

Gaston-Mecklenburg Bridge at Mt. Holly.

The Virginia Bridge & Iron Company, whose general offices are in Roanoke, Va., has recently contracted with the commissioners of Gaston and Mecklenburg counties, North Carolina, for the construction of a large highway bridge over the Catawba river at Mt. Holly, North Carolina. As reported in the trade papers competitive bids were recently opened by the commissioners.

Many years ago the structure which spanned the river at this point was washed away by high water and since that time the only means of crossing has been by ferry. The decision of the commissioners to construct a steel bridge is the consummation of years of effort to secure an adequate and modern highway crossing.

The new bridge will cost approximately \$19,000 and is 960 feet long, there being two main river spans, each 200 feet in length, together with about 560 feet of steel approach. The plans and specifications were prepared by the Virginia Bridge & Iron Company's engineer,

Mr. E. E. Hanks, whose offices are at Charlotte, North Carolina.

* * *

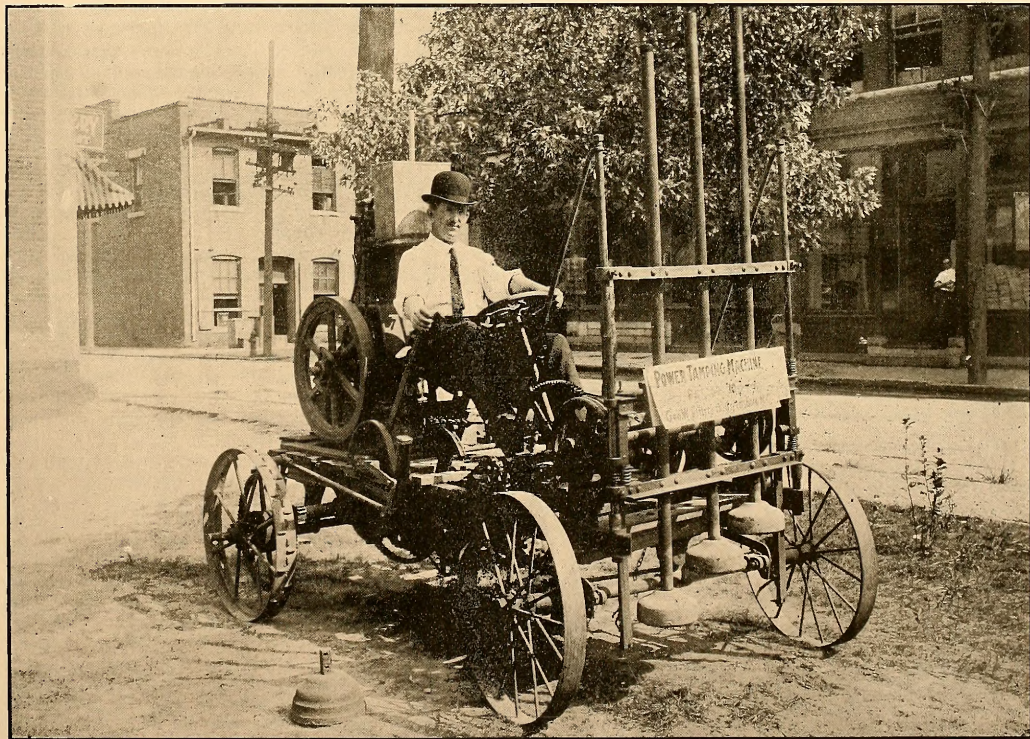
A Tamping Machine.

Mr. George W. Pritchett, of Greensboro, has invented a tamping machine for use in tamping dirt, stone, etc., in roads or ditches. A cut of the new machine, with the inventor at the lever, is shown herewith.

Mr. Pritchett claims that the machine will fill a "long-felt want," in that with it country roads may be repaired economically and efficiently. He says that it will be found far superior to the ordinary road roller, which simply mashes, or case hardens the surface and the crust formed is easily broken through.

The tamping mechanism consists of three heads, weighing from 90 to 100 pounds. They are raised 20 inches and dropped, 25 times per minute. The material is placed in a hole in the road and thoroughly bedded down, so that it becomes a part of the road itself and the patch is just as strong as any other part of the road.

The machine is self-propelled and is capable of a speed of from 2 to 3 miles per hour. A wagon or cart can be attached to the rear end of the machine, containing the material needed for the patching, and a barrel of water to help in packing the material. Mr. Pritchett says that one man and his machine can care for 15 miles of road, keeping it in first-class condition all the time.



Mr. George W. Pritchett, of Greensboro, N. C., and his power tamping machine

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Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

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Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary



ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

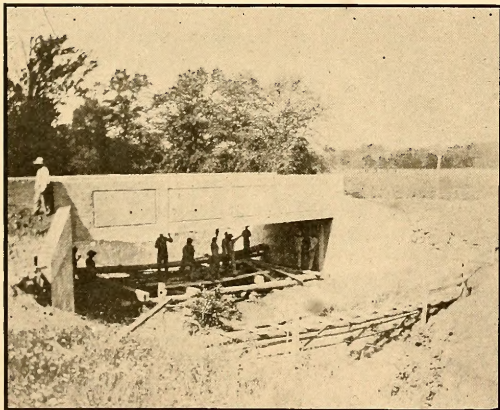
Bridge Over Berry Run, Orange County, Virginia.

The accompanying photograph shows a reinforced concrete bridge recently completed over Berry Run in Orange county, Virginia, and situated about eight miles southeast of Orange House on the Pamunkey Road. Prior to the erection of this bridge and to the improvement of the Pamunkey Road, the stream was forded at this point. The improvement of the Pamunkey Road is being carried forward by the county using state aid in the form of convict labor. Such convict labor under the direction and supervision of Mr. J. D. Micks was

own weight and that of a 12" cushion of ballast, a live load of a 12 ton road roller. The superstructure contains 44.09 cu. yds. of concrete mixed in the proportion of one part No. 1 Portland Cement, two parts of sharp clean sand and four parts of broken stone, ranging in sizes from one-quarter inch to one and one-half inches and is reinforced with structural steel square bars. In designing the 40' 0" span, the load of slab was transferred to the girders by means of cross beams and no stringers were employed in the design. The cross beams were designed as T beams. Each girder was reinforced with 5—1¼ inch square bars and 45—½ inch square bar stirrups while the reinforcement of each cross beam consisted of 5—1 inch square bars and 19—½ inch square bar stirrups. The main reinforcement of the slab was placed longitudinally and consisted of 19—¾ inch square bars. In order to further distribute the load of the slab, 20—5/8 inch square bars were used transversely. Bars of continuous lengths were furnished for all reinforcement and, notwithstanding the fact, deformed bars were used, all bars were beat at the ends to further insure mechanical bond. The total weight of the steel required for reinforcement amounted to 9190 pounds.

The substructure consists of two abutments with wings, resting upon solid rock foundation. Wings 11' 0" long inclined at an angle of thirty degrees were provided at the upstream ends of each abutment, while straight wings 9' 0" long were provided at the down stream ends. Both abutments contained 109.3 cu. yds. of concrete. They were built of plain concrete mixed in the proportion of one part No. 1 Portland Cement, three parts sharp clean sand and six parts of broken stone, ranging in size, from ¼" to 2½".

The form for the superstructure was so designed as to avoid any settlement due to the fact very green lumber was used throughout. The form was supported by six bents built up, each, of 4 round timbers, cross-braced with two pieces of 2"X6" and capped with an 8"X8" cap composed of four pieces of 2"X" spiked together. Double wedges were provided between the top of posts and caps to level the form. Each main girder was carried underneath by three lines of 4"X8" which rested upon the bent, the floor slab was supported by seven lines of 2"X10" stringers, which rested upon blocks and these in turn rested upon the 8"X8" caps. The blocks which acted as seats for the stringers carrying the slab were also utilized by flooring with 1" material to form the cross girders. Flooring 1" in thickness was used throughout. Panels were framed as shown by the addition of 1½ moulding fas-



Handsome concrete bridge over Berry Run, in Orange county, Virginia

used solely in the erection of this bridge, and while no engineering or construction problems of importance entered into the erection, the economical cost of construction is worthy of consideration.

Rising in the foot hills of the Blue Ridge Mountains, Berry Run flows through a partially cleared country and drains about 5400 acres of rolling land above the bridge site. Due to the topography of the drainage area and furthermore to the fact that drift is carried by the stream at high water, it was deemed advisable to avoid placing an obstruction in the channel and, therefore, a clear span was used in the design for the superstructure.

The superstructure consists of one 40' 0", reinforced concrete span with a 12' roadway and is of the through girder type. The span is designed to carry, besides its

tened to the side forms. Side forms were made of 1" moulding fastened to the side forms. Side forms were made of 1" lumber, edged, planed on one side and sized and were thoroughly wired throughout and braced with 2"x4" timbers.

Stone for the concrete was found near the bridge site and consisted of a coarse grained granite. Good sand was located in the bed of the creek. In the estimate of the total cost of the bridge, convict labor was charged at ten cents per hour. The total supervision of the work amounted to \$88.50 and the convict labor to \$413.00. The cost of cement delivered at Orange was \$411.05 while the cost of steel delivered at the same station was \$187.00. The total expenditure for the bridge complete, including convict labor and all materials, was \$1324.81.

The appearance of the structure was in no wise sacrificed to lower the cost of construction. The bridge stands as a permanent improvement fully justifying the expenditure, and its ornamental appearance, at quite a saving in first cost to the county, is a silent witness to the efficiency of convict labor in Virginia.—By Mr. Charles D. Snead, Bridge Engineer, Virginia State Highway Commission.

* * *

Richmond-Norfolk Highway.

Robert W. Arnold delivered the principal address at a mass meeting of farmers and motor car enthusiasts at "Engleside," the beautiful Dillard homestead on Old Plank Road, between Petersburg and Courtland. The occasion was a basket picnic participated in by fully 250 persons, who were brought together to boost the Richmond-Norfolk Automobile Highway.

Mr. Arnold is an attorney from Waverly and he suggested the organization of a road association composed of citizens of the various districts of the county to be worked out on purely business lines in the nature of a business men's association. His remarks

were well received and the suggestions will be followed up with good results to all concerned.

The girls of the Homeville High School served ice cream and other refreshments for the benefit of the school fund, this feature being in charge of Mrs. George H. Blood, the present owner of the historic old Engleside. Dinner was served on the grounds to everyone, and the occasion was one of the most successful and enjoyable ever held in Sussex county.

* * *

Goochland County.

Governor Stuart, Superintendent J. B. Wood of the State penitentiary and L. L. Scherer of the penitentiary board, have returned from the conference with the board of supervisors of Goochland county, in reference to good roads.

The object of the conference was to secure more highway improvements for the county. The supervisors had asked for the conference, setting forth that the roads were badly in need of attention. They suggested that conditions might be improved if the convicts now employed on the state farm were put to work on the roads. Members of the penitentiary board favored the suggestion, while explaining to the supervisors that there was no available fund for providing machinery and materials. It was finally decided to instruct the superintendent to furnish gangs of men for the labor alone, the county to provide the machinery and materials for the road work. These convict gangs will be sent to the Goochland roads at such times as it may be advisable to dispense with their work on the farm.

The result of the conference was satisfactory to the supervisors, who expressed their appreciation to the Governor and the members of the State Penitentiary Board. A bill for the better improvement of the Goochland roads was introduced in the last Legislature, but failed of passage.

Road Building in N. & W. Territory

By E. A. SCHUBERT

Assistant Land and Industrial Agent N. & W. Railway Co., Roanoke, Va.

IN the States traversed by the Norfolk & Western Railway, much progress is being made in the construction of good roads. There is scarcely a county traversed by this great artery of transportation, in which some progress has not been made in the construction of good roads, either sand-clay, gravel, macadam, concrete or brick. Some counties have voted bonds in large amounts. Among these counties are Forsyth, Rockingham, Durham and Person, in North Carolina; Wise, Russell, Tazewell, Smyth, Pulaski, Montgomery, Washington, Rockingham, Clarke, Warren, Prince Edward, Nottoway, Amherst, and several others in Virginia; also Jefferson, Mercer, Mingo and McDowell, in West Virginia, while every county in Ohio traversed by the Norfolk & Western Railway is building good roads, either by direct taxation or bond issue.

The legislature of North Carolina has appropriated about \$5,000 for road betterment and the four counties mentioned above have expended up to the present, either by direct levy or bond issue about \$1,500,000, and have constructed over 500 miles of permanent highway.

In Virginia the counties mentioned, have expended over \$2,700,000, secured by bond issue, and over \$1,000,000 by direct taxation, making a total of nearly \$4,000,000. As a result there has been constructed and thrown open to the public, or now in the course of construction, about eleven hundred miles of improved highways. The recent legislature of Virginia has made provision for the expenditure of about \$2,000,000 more within the next two years; while West Virginia has appropriated about \$2,300,000 for the same purpose. In addition to these large amounts have been voted for road building by the individual counties, the latest being Mercer county, West Virginia, of which Bluefield is the metropolis. This county has come forward with a bond issue of \$500,000 with which to improve its highways.

It is safe to state that within the past eight years in the territory traversed by the Norfolk & Western Railway there has been appropriated and spent over \$12,000,000 for permanent road improvement and as an evidence of this expenditure we have nearly three thousand miles of modern highways and more are being built each year.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

Concerning the observance of good roads days in Alabama on August 14 and 15, the Birmingham Age Herald says:

Friday and Saturday were good roads days in Alabama and there is every reason to believe that a far larger number of men contributed their services than was the case last year, when the turn out was by no means small. Reports from several counties have been received, and each of them indicate that the farmers and others who labored with pick and shovel not only improved the highways but aroused enthusiasm that will have far-reaching effect for good.

It is safe to assume that the work done in the two days designated will be worth millions of dollars to the state as a whole, and be of incalculable benefit to every community. The observance of good road days was very general. There was not a county probably in which 1,000 or more men were not doing their best to better road conditions.

* * *

Florida.

Mr. Ed. Scott of Arcadia, Fla., writes concerning Senator Bryan's good roads bill as follows:

Some days ago I was interested to read that our own Senator Bryan had made an amendment to a proposed good roads bill before Congress, which seems to me to be one of the most far-reaching, logical propositions ever yet thought out, and I hope to see our state papers and the good roads papers of the country take it up and give it the publicity it deserves. This bill, in effect, would enable us to retire our six per cent bonds in thirty-three years by simply paying the interest.

The bill provided that the government should issue \$50,000,000 of three per cent road bonds to be sold as required and the funds to be used to take up state four per cent bonds, the extra one per cent going to retire the bonds which would be accomplished in 100 years, the state in turn would issue as many bonds as the counties of the state might require from time to time that county issuing the usual five per cent or six per cent bonds the two per cent or three per cent in excess of interest paid by the state to go to retire the bonds which would be accomplished in thirty-three to fifty years by simply paying what would otherwise be paid in interest.

Senator Bryan certainly shows a clear insight into the situation, as this plan would enable both the government and the state to exercise proper restrictions, as to a completed whole as between counties and yet does not curtail local selection and construction.

To every community it must be apparent that if the government is to build roads we are to pay the tax and by this plan we would be more apt to get our equitable portion.

Senator Bryan's amendment does not seem to offer enough to the office seeker, but it is chock full of road building.

* * *

Louisiana.

The New Orleans Item notes that a trans-Louisiana automobile tour September 7 to 12 and a Southern good roads conference in New Orleans the middle of

October are being arranged to boost construction of the ocean-to-ocean highway by way of Gulf cities.

John B. Kent, secretary of the Gulf and Interoceanic National Highway association, has established headquarters in New Orleans to promote the tour of the conference. State officials, commercial organization heads and automobile enthusiasts are backing up both projects. The trans-state tour will follow the route laid out by The Item's pathfinding car driven by E. L. Ferguson last year.

"Governor Hall, State Highway Engineer W. E. Atkinson, State Immigration Commissioner Justin F. Denechaud, C. H. Sweetser, of Lake Charles, and other prominent men, have been invited to go on the automobile trip," said Mr. Kent. "President Joseph O. Schwartz, of the Gulf and Interoceanic Highway association, Ginder Abbott, of the New Orleans Automobile Dealers' association; E. R. Greenlaw, of the Fairchild Automobile Company, and other dealers and enthusiasts in New Orleans, will make the trip in whole or in part."

The October roads gathering in New Orleans will be a series of four conferences, according to the official call for the meeting sent out by Mr. Kent.

The first will be a conference of county and parish officials to discuss road taxes, bond issues for roads and road building with prison labor. The second will be an interstate road conference, composed of members of legislatures of the states interested in the highway movement, to discuss the questions of state highway departments, state bond issues for roads, state prison labor and road laws.

The third conference will be participated in by governors, together with members of Congress from the several states. The fourth will be a road builders' conference to which are invited road engineers, heads of state and parish highway departments, road contractors and builders of road making machinery.

"All of the Southern states have been invited to participate in the road conference," Mr. Kent said. "We have asked Speaker Champ Clark, John Temple Graves, Logan Waller Page, Dr. Joseph Hyde Pratt, Col. Dell M. Potter, of Arizona; D. E. Colp, of San Antonio; Governor Hall, Governor-elect Ferguson of Texas; Governor Earl Brewer and other prominent men to be here."

* * *

Missouri.

A cross state tour about the middle of September was decided upon by the executive committee of the Hannibal-St. Joseph Cross-State Highway Association, which met at Shelby, in Shelby county, Mo., Aug. 10. This will be arranged in detail and efforts will be made to have every town and city along the route represented by a number of automobiles.

The committee decided to award the contract for marking the route across the state with the Pike's Peak Ocean-to-Ocean markers and a committee consisting of R. S. Brownlee, Brookfield; Harry A. Scheidker, Hannibal; John L. Zeidler, St. Joseph, was appointed. A steel marker bearing a snow capped mountain and the name of the association will be placed along the road as each city is entered and at the point the highway leaves the city. They will also be placed

every five miles along the route. The posts between will be painted with a red and white band, ten inches to each color.

Much good work along the highway was reported especially on the east end. With the completion of what is now under way or in contemplation it is believed that the road will be in good shape.

Judge T. J. Rice of the Shelby county court, who is also a member of the executive committee, reported that a new road had been built from Lakenan to Salt river, north of the railroad. Near the river bridge the road strikes the hills and considerable work is necessary. Judge Rice told the committee that \$18,000 was available for this work which would soon be started and which he thought was sufficient.

The road from Rensselaer to Huntington in Ralls county will soon be in good shape as work was started recently to thoroughly improve this stretch which has been rather troublesome.

The following members of the committee were present: President C. F. Adams, Chillicothe; Secretary Harry A. Scheidker, Hannibal; Treasurer, M. B. Proctor, Monroe City; R. E. Brownlee, Brookfield; J. O. VanOsdol, Bucklin; T. J. Rice, Shelbina. Several persons interested in good roads attended. In addition to many of the business men of Shelby there were delegates from Monroe City, Bucklin, Clarence, Lakenan and several other towns.

Texas.

According to a report issued by the Texas Business Men's association, July was an exceedingly bad month for good road bond elections in Texas, only three having been voted on during that period.

This is the smallest number of highway bond elections held in Texas in any one month, and is also the lowest amount authorized since June, 1913, when only \$75,000 was issued.

Two issues carried, one in the Electra precinct of Wichita county, July 7, for \$125,000, and a \$10,000 bridge bond issue was ratified in Lampassas county July 13 by a handsome majority. The unsuccessful issue was conducted in the Denton precinct of Denton

county, July 18, and entailed highway construction bonds aggregating \$300,000, which is more than twice the amount of road bonds authorized during July.

The lack of interest in good roads work in July and the small number of elections ordered during that time

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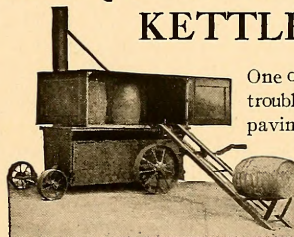
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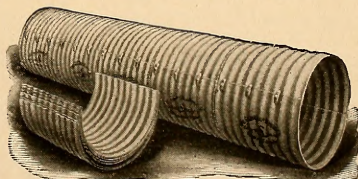
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is said to be largely due to the enthusiasm manifested in the state and primary elections.

Although the roads bonds issued in Texas during July were below the amounts authorized during the previous months of 1914, it does not detract from the enormity of this year's road bond figures, which are far above the average, and from present indications will exceed any previous record established in the state since the enactment of the road bond law. So far this year, seventy-six good road bond elections have been conducted in Texas. Of that number, fifty-three were successful, and sanctioned the issuance of public road bonds aggregating \$6,716,500 in the various counties of the state.

During the twelve months of 1913, there were eighty-six road and bridge bond elections conducted in the Lone Star state, resulting in fifty-one issues being ratified at the polls, signaling the issuance of highway building and maintenance certificates totaling \$7,267,000.

The amount of highway improvement bonds authorized in Texas up to Aug. 1 of this year lack only \$550,500 of equaling the total issues for 1913 road work.

The road bonds which have been issued during the seven months of this year exceed the record established in 1912 by more than \$3,000,000, but fall approximately \$2,000,000 behind the 1911 figures. They lead the 1910 and 1909 highway bonds issued by several million dollars.

Since January 1, 1909, up to Aug. 1, 1914, there has been appropriated in Texas for public road work the enormous total of \$31,191,400. This is an average of a little more than \$15,327 per day for highway construction, or approximately \$8 per capita for the period. Practically every county in Texas has participated in these elections at one time or another.

The following table shows the amount of road building certificates authorized in this state since 1909 by years:

| Year— | Amount of Bonds |
|---------------------------------------|--------------------|
| 1909 | \$ 781,000 |
| 1910 | 4,015,000 |
| 1911 | 8,915,000 |
| 1912 | 3,496,200 |
| 1913 | 7,267,700 |
| 1914 (seven months' record) | 6,716,500 |

Total \$31,191,400

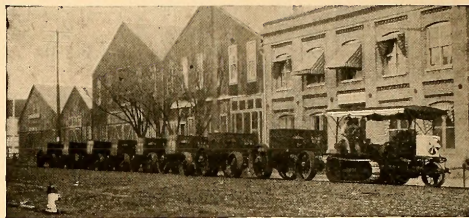
West Virginia.

Success in convict road work is reported from West Virginia. This road work has been developed as the result of legislation passed at the last session of the legislature. Prior to this session Governor Hatfield and representatives of the legislature and supreme court journeyed to New York for conference with the National Committee on Prisons and Prison Labor.

At the conference, in which representatives of the Department of Highway Engineering and the bill drafting bureau of Columbia University participated, a State road bureau was planned to co-operate with the state prison department in working the prisoners upon the public roads.

A recent report received by the National Committee on Prisons and Prison Labor from A. D. Williams, chairman of the road bureau, states that to date three convict road camps have been established, the men being under the honor system and living in tents. Two of the camps are located on a stream and the men

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each evening go bathing and enjoy all the liberties of camp life. Three Italians have attempted to escape, but the Americans and negroes are proving themselves worthy of trust.

At St. Mary's camp, in solid and loose rock, the men have averaged 4.03 cubic yards per day. At the Inwood camp the average was 4.33 cubic yards, which included the erection of one concrete culvert 20x30 feet long, and sixteen days labor for one man out of 118 laying tiling.

A crew of citizen labor was also working at St. Mary's camp on the same work and an interesting comparison of costs was made: the cost of moving material by citizens was 85 cents per cubic yard against 30 cents with the prisoners.

These developments indicate that through road work West Virginia will to a great extent solve her prison problem, as will any state wherein co-operation is secured between the highway and the prison departments.

GOOD ROADS NOTES IN BRIEF

Dallas, Texas, has contracted for \$150,000 of street paving.

Richmond, Va., has let contracts amounting to \$60,000 for street work.

Chatham county, Ga., will vote soon on a road bond issue of \$400,000.

Washington, D. C., will construct 78,000 square yards of cement sidewalks.

Leon county, Texas, has available for road work \$40,000.

Mr. W. B. Crossland, Sr., highway engineer for the U. S. Office of Public Roads, has established headquarters in Austin, Texas, and will direct the work of building a great highway between Austin and San Antonio. The road is to cost \$250,000.

Maverick county, Texas, has voted bonds for \$25,000 to build roads.

Andalusia, Ala., has available for sidewalks and streets, \$40,000.

The Maryland State Roads Commission has contracted for road construction amounting to \$292,755. Montgomery county, Tenn., has let contracts for road work amounting to \$35,000.

Lexington, Ky., has let contracts for street paving to cost \$200,000.

Perry county, Ala., has contracted for the completion of state road amounting to \$10,074.

Old Fort township, McDowell county, North Carolina, has let contract for work on the Central Highway to cost \$20,119.

Paintsville, Ky., will spend \$23,000 on vitrified brick paving.

Pine Bluff, Ark., has contracted for street paving to cost \$23,750.

Trinity, Texas, has contracted for 33 miles of brick paving to cost \$76,000.

Williams district of Wood county, W. Va., will spend \$70,000 on concrete highways.

Powhatan county, Virginia, is preparing to build 4 miles of model top-soil road.

Brazoria county, Texas, has been asking for bids on 12 miles of hard surfaced road.

Wilmington, N. C., will pave 18,000 square yards of streets.

Lampasas county, Texas, will build four bridges at a cost of \$16,000.

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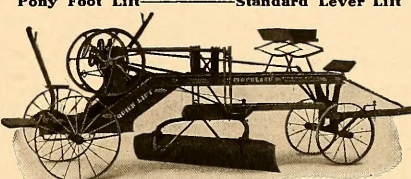
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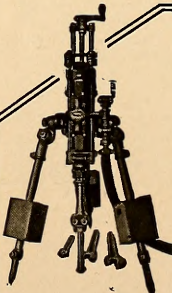
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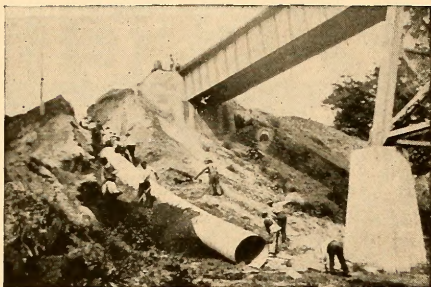
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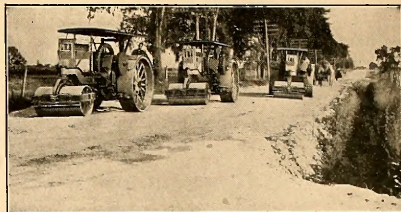


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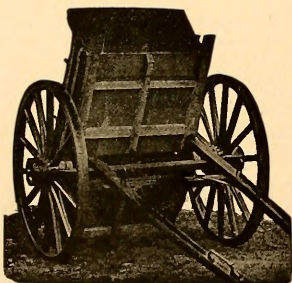
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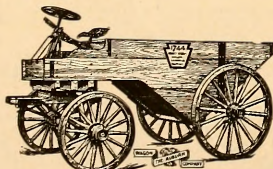
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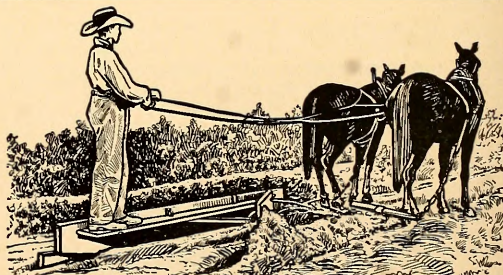


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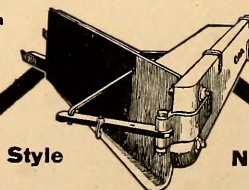
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No. 1

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Importance of American Road Congress to Southern Road Builders

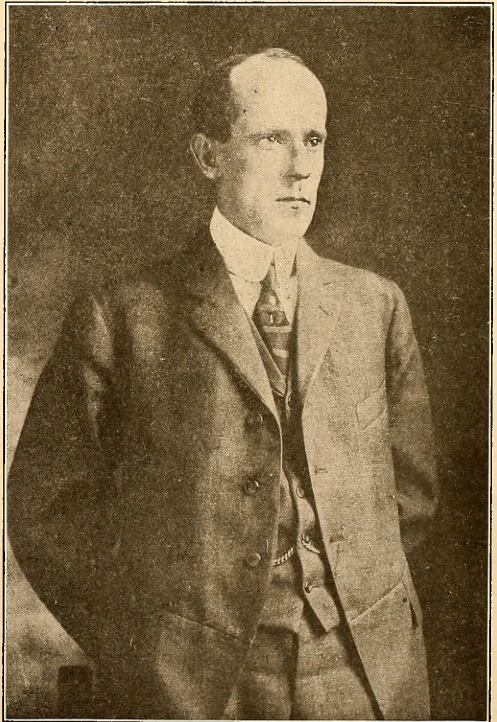
By **LOGAN WALLER PAGE**

Director U. S. Office of Public Roads, President American Highway Association

IT is very gratifying to me to be able to announce, through Southern Good Roads, that the prospects for the Fourth American Road Congress, to be held in Atlanta during the week of November 9, are especially bright. There appears to be a deep and widespread interest in the great annual meeting and I am particularly impressed by the fact that a large number of counties and municipalities are arranging to take part officially, through the sending of county and municipal officials, by formal authorization. The primary purpose of the Congress is educational rather than propaganda. It is to give information and advice which will prove helpful in the solution of road problems of every character, from the selection of materials to the formation of a state highway department, and from the determination of the cost of moving a yard of earth to the great problem of financing a highway system involving millions of dollars outlay. Because of this educational purpose it is of the utmost importance that the men who have to deal directly with the road problems, such men for example as county commissioners, county judges, county engineers, street commissioners, city engineers and state highway engineers, should be present in person at the annual congress to intelligently present to each other their respective difficulties and the means by which they are overcoming them and to endeavor to work out through joint effort the ways and means of accomplishing lasting success.

It is important particularly to the South to be fully represented at the various sessions of the Congress because the road systems of the South are now in a formative stage, and it is essential that southern road builders should profit to the fullest extent from the more extended experience of the road builders from other states, particularly the northeastern states, where the subject has received the closest attention and where road improvement has been conducted on a very large scale for at least a generation. There will be many men eminent in the profession of highway engineering from the middle western states and from the Pacific Coast, as well as from the northeastern states. I am informed by the program committee that the official heads of at least 75 per cent of the state highway departments, throughout the United States will be in attendance at the Atlanta meeting and already assurances have been received which indicate a very large attendance of successful county highway

engineers, city engineers and street commissioners. It must be borne in mind that the advice and information which these men will give in the form of discussions and the informal talks which are always a fea-



HON. LOGAN WALLER PAGE

ture of the annual road congress would be worth, on a commercial basis, thousands of dollars. I cannot therefore too strongly urge the county and city officials of every southern state to profit by this opportunity

and mingle with the foremost authorities in road and street work of the day. In calling attention to the eminent road builders from the northern and western states, I do not mean to disparage the ability of the southern men who are taking up this work, for the south is going ahead as rapidly, taking all things into consideration, as any other section of the country in the building of an adequate highway system, but for that very reason it is essential that the south render this progress more certain, more efficient, and more lasting through the acquirement of information and advice from every other section of country.

I believe that the comprehensive exhibit of the Congress will prove most instructive to delegates and visitors, embracing as it does many ingenious models to be shown by the national government, and the state

governments, as well as a vast array of machinery and materials to be shown by the various commercial exhibitors. I am informed that Fulton County, Georgia, of which Atlanta is the county seat, is arranging a series of object lessons in road construction showing many types of road in various stages of construction. These should prove of great educational value, particularly when inspected by men who can compare the methods, equipment, and materials used, with others which have come under their observation.

I believe the Fourth American Road Congress will prove a powerful factor in the acceleration of the road movement throughout the southern states along intelligent and effective lines and I earnestly trust that it will receive recognition and support which southerners, for their own good, should give it.

Program of the American Road Congress Atlanta, November 9-14

The Fourth American Road Congress will be held in Taft Hall in the Auditorium, in Atlanta, beginning Monday, November 9, and ending Saturday, November 14. All members and delegates will register at the office of the Executive Secretary at the Winecoff Hotel, up to the morning of the 9th, after which his office will be in the Auditorium building. The sessions will be held as follows:

National Legislation, Monday, November 9th; State Legislation, under auspices of American Bar Association, Tuesday forenoon; Finance Session (under the auspices of the Bankers' Associations) Tuesday forenoon; The Merit System in Road Administration, under auspices National Civil Service Reform League, Tuesday afternoon; special addresses by men of national prominence on Tuesday; Construction and Maintenance, Wednesday forenoon and Thursday forenoon; Traffic, Thursday afternoon; Georgia Day, Friday; Business sessions and consideration of future Congresses, Saturday.

PRESIDING OFFICERS.

The following named gentlemen will preside over the various sessions of the Congress:

Austin B. Fletcher, President American Road Congress, State Highway Engineer of California; Logan Waller Page, President American Highway Association, Washington, D. C., Director U. S. Office of Public Roads; Edward M. Bigelow, First Vice-President, State Highway Commissioner of Pennsylvania; W. E. Atkinson, Second Vice-President, State Highway Engineer of Louisiana; A. N. Johnson, Third Vice-President, former State Highway Engineer of Illinois; C. A. Magrath, Fourth Vice-President, Chairman Ontario, Canada, Highway Commission; George C. Diehl, Chairman Executive Committee, Chairman Good Roads Board American Automobile Association; and W. Tom Winn, Commissioners of Fulton County, Georgia, and chairman of local Executive Committee.

WOMAN'S CONFERENCE.

On Tuesday, the 10th, a Woman's Conference will be held under the auspices of the Woman's Department of the American Highway Association, of which Mrs. Robert W. Baker, of Washington, D. C., is Chairman, at the Hotel Ansley. All women interested in the bet-

terment of the roads are cordially invited to be present.

PARTIAL LIST OF PAPERS AND ADDRESSES TO BE PRESENTED.

General Addresses.

Fairfax Harrison, President Southern Railway.
Logan Waller Page, Director U. S. Office of Public Roads.
Col. E. A. Stevens, State Highway Commissioner of New Jersey.
Brig. Gen. Wm. T. Russell, U. S. A., Retired.
James R. Marker, State Highway Commissioner of Ohio. Others to be announced.

Drainage Structures.

By W. E. Atkinson, State Highway Engineer of Louisiana. Discussion opened by Frank S. Rogers, State Highway Commissioner of Michigan.

System in Road Management.

By C. J. Bennett, Highway Commissioner of Connecticut. Discussion opened by Paul D. Sargent, State Highway Engineer of Maine.

Maintenance Methods and Relation to Traffic.

By George W. Cooley, State Highway Engineer of Minnesota. Discussion opened by H. R. Carter, State Highway Engineer of Arkansas.

Convict Labor.

By George P. Coleman, State Highway Commissioner of Virginia. Discussion opened by J. E. Maloney, State Engineer of Colorado.

Rights of Way.

By Austin B. Fletcher, Highway Engineer of California. Discussion opened by ———
Efficiency in Highway Organization, Centralization of

Purchases, Etc.

Discussion opened by John S. Gillespie, Road Commissioner of Allegheny County, Pennsylvania.

Surfaces for Light Volume Mixed Traffic.

By S. Percy Hooker, State Superintendent of Highways of New Hampshire. Discussion opened by S. D.

Foster, Chief Engineer State Highway Dept. of Pennsylvania.

State Control of Road Work as a Policy.

By A. N. Johnson, Former State Highway Engineer of Iowa.

Engineering Supervision of Road Construction.

By W. S. Keller, State Highway Engineer of Alabama. Discussion opened by R. C. Terrell, State Highway Commissioner of Kentucky.

Economics.

By J. E. Pennybacker, Chief Division of Economics, U. S. Office of Public Roads.

Educational Field for Highway Departments.

By Dr. Joseph Hyde Pratt, State Geologist of North Carolina. Discussion opened by Col. Sidney Suggs, State Highway Commissioner of Oklahoma.

Heavy Traffic Roads.

By Henry G. Shirley, Chief Engineer, State Roads Commission of Maryland. Discussion opened by W. A. Hansell, Superintendent of Public Works, Fulton County, Georgia.

Grades and Excavation.

By A. D. Williams, Chief Road Engineer of West Virginia. Discussion opened by William J. Roy, State Highway Commissioner of Washington.

National Legislation.

Addresses by:—

Hon. John H. Bankhead, United States Senate.

Hon. Dorsey W. Shackelford, U. S. House of Representatives.

Hon. William P. Borland, U. S. House of Representatives.

Others to be announced.

Civil Service Reform.

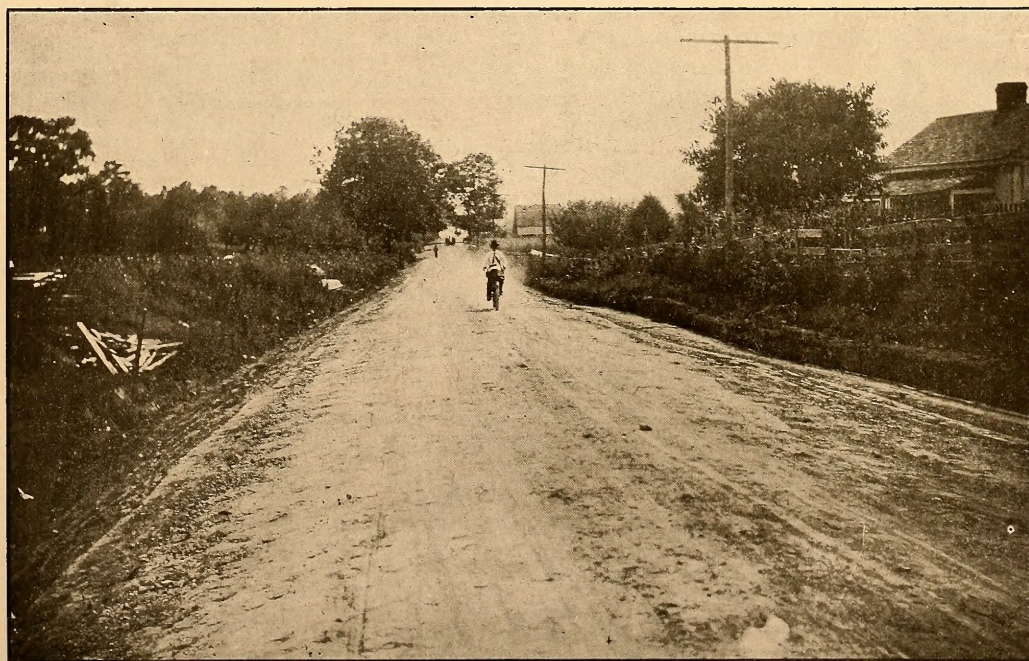
Speakers and subjects will be announced later by National Civil Service Reform League. It is expected that Hon. John A. McIlhenny, President U. S. Civil Service Commission, and John H. Fahey, President of the Chamber of Commerce of the United States, will be on the program, and that Richard Henry Dana, President of the National Civil Service Reform League, will preside.

Georgia Day.

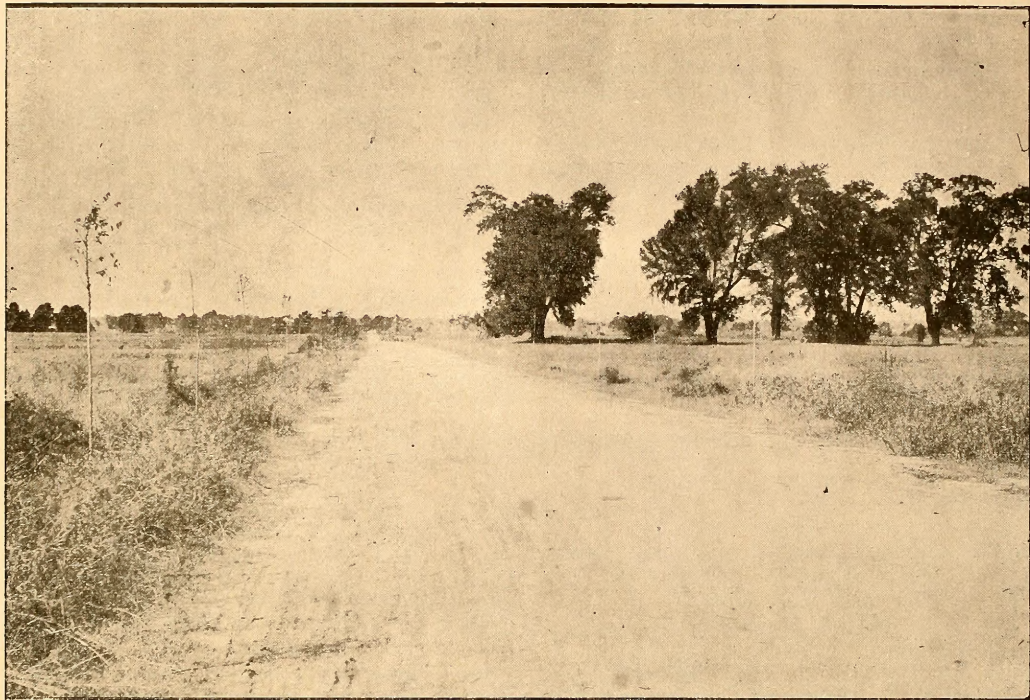
The Georgia Day Program has not yet been made up but will probably include Dr. S. W. McCallie, State Geologist of Georgia, on Road Materials of Georgia, (illustrated); Prof. Charles M. Strahan, Dean of Engineering, University of Georgia; Prof. R. D. Kneale, Associate Professor of Engineering, Georgia School of Technology; Hon. W. F. Bennet, former Member of Congress from New York; Hon. John L. Hamilton, former President American Bankers' Association, Columbus, Ohio; Hon. E. J. Watson, Commissioner of Agriculture, Charleston, S. C.; Judge R. E. Davidson, Chairman Georgia Prison Commission; Hon. John Craft, Chairman Alabama Highway Commission, Mobile, Ala.; Hon. Emery Winship, Chairman Good Roads Committee, Georgia Chamber of Commerce; Gen. Clifford L. Anderson, Fulton County Commissioner, Atlanta, Ga.; and prominent local officials.

Special.

The Congress will be addressed by Mrs. Daisy McLaurin-Stevens, President General, United Daughters of the Confederacy, on Monday, November 9th.



Chert Road Near Summerville, Ga. U. S. Mail making 30 miles an hour over it. Photo by U. S. Office of Public Roads



Road Near Savannah, Ga., which has red clay center and gravel sides of cream yellow and red tints slightly darker than the center of the road.
Photo by U. S. Office of Public Roads

Special Trains For American Road Congress.

Elaborate preparations are being made by the railroads to accommodate the good roads workers who will gather at Atlanta, Georgia, for the Fourth American Road Congress during the week of November 9. A special train will be operated by the Pennsylvania Railroad and the Southern Railway, leaving New York on Saturday November 7 and arriving at Atlanta on November 8. Special cars will be put on for Philadelphia, Baltimore, Washington, Richmond and Norfolk. Delegates from the west and middle west will have the advantage of a special train leaving Chicago on the evening of November 7 and passing through Indianapolis, Cincinnati and Chattanooga en route to Atlanta. Arrangements are now being made for special service from Texas and southwestern points. Exceptionally low rates have been granted, particularly in the territory south of the Potomac and east of the Mississippi, where the rate per mile will average $1\frac{1}{2}$ cents. Greatly reduced rates have also been granted in western territory, as well as on the eastern trunk lines, so that all delegates and visitors will find travel possible at an exceptionally low cost.

On account of the great improvement made within the past few years on the public highways south of Washington, considerable interest is manifested in touring facilities. Among the parties arranging to make the trip by automobile are members of the State Board of Public Roads of Rhode Island who expect to attend the Congress in a body. Not least among the important factors which have made for better road conditions between Washington and Atlanta is the co-operative object lesson in maintenance inaugurated by

the American Highway Association and now in practical operation by the U. S. Office of Public Roads. Despite the general impression which exists to a certain extent in other sections of the country that the south is backward in the use of modern road building methods, Fulton county, Georgia, of which Atlanta is the county seat, is planning to show the delegates actual samples, completed or in course of construction of every known type of road adapted to modern traffic conditions.

An interesting comparison of results accomplished by the various states and their subdivisions will be afforded by the series of models, maps and materials which will comprise respective state exhibits. The New York Highway Department is planning an exhibit of such striking proportions and comprehensiveness as will rival even the remarkable series of models to be shown by the Federal Government. Temporary structures are now being prepared to house the overflow of exhibits, which are to extend from the auditorium a distance of three entire city blocks.

Old and New Ways of Travel at Ohio State Fair.

For the first time, and at the cost of many thousand dollars, a Good Roads Day will be on the program of the Ohio State Fair. A mammoth pageant showing all the old time ways of travel, from the camel down to the latest invention of man, will be given four days during the fair. The State Highway Department, under the direction of Commissioner Marker, will have this in charge. This pageant will require over one mile of wagons, autos, and old time vehicles of all descriptions, showing the evolution of transportation.

Roads in Fulton County, Georgia

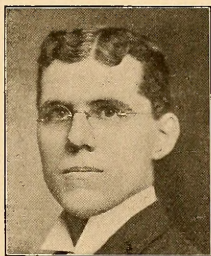
By W. TOM WINN

County Commissioner, Chairman Executive Committee of Arrangements
American Road Congress, Atlanta, Ga.

Fulton County, Georgia, of which Atlanta is the county seat, has approximately 200 miles of paved roads radiating in every direction out of Atlanta. It is a well known fact that Fulton county ranks right along with Alleghany county, Penn., and Jackson county, Mo., and in fact with the most up-to-date communities in this country in the "good roads movement," and the percentage of paved roads is very high when you take into consideration the fact that Fulton county has an area of only 74 square miles, and 26 square miles of the 74 is taken up by the city of Atlanta.

For four or five years Fulton county has had an average of 550 to 600 male convicts at work grading and paving roads, building sewers, maintaining the county farm where all the truck, meat, etc., is raised, repair work and doing various construction work for the city and I might say that an average of half the convicts work inside the city twelve months in every year.

Almost all the paved roads in Fulton are clay bound macadam, perhaps 175 miles. They are from 20 to 60 feet in width, averaging about 32 to 34 feet, and every paved road has stone gutters and headers. Granite



W. TOM WINN

abounds throughout the county and all stone used is quarried near the particular work under construction.

Our work is also facilitated by having our convicts divided into six camps, and located in various sections of the county, convenient to the work. In addition to the 600 convicts the county employs about 350 free laborers, consisting of drivers, guards, engineers, blast-ers foremen and superintendents, making a total of about 950 men per day, and the annual cost of the public works department is around \$475,000.

Our equipment consist of 380 mules and 190 wagons; two traction engines, cars, graders and scarifiers; two steam shovels, 12 four wheel graders, 30 two wheel graders, six 3½ ton power dump auto trucks, one Asphalt plant, six road rollers and such other equipment necessary to keep a big force going.

I have apparently gotten off my subject, but I fell that the above facts were interesting in view of the general growing sentiment in various sections of the country with regard to using convicts on the public roads.

In addition to our macadam roads, we have built in the past few years about 25 miles of penetration or asphalt binder roads, using practically all the different brands of asphalt on the market. They are all in very

good condition and are such roads as Peachtree Road, which is 60 feet between curbs, Wesley Avenue, Brown Mill Road, Jonesboro Road, East Point Road and others.

As a maintenance proposition we have found it very advantageous to oil some 65 or 70 miles of our macadam roads, and in addition to rendering the roads dust proof and more pleasant to ride over, we believe it economical in the upkeep; these roads all speak for themselves, in verifying the above statement.

More than 30 miles of these oiled roads have been treated once a year for three years. We apply the oil hot and cover with sand or granite screenings, though we have in cases where no sand or screenings were convenient used dirt or clay from the road side.

During the Road Congress we will have in course of construction a concrete road on Andrews avenue, being 1¼ miles in length and 30 feet wide—18 feet of concrete and 6 foot rubble stone gutters. This work will all be done by convict labor.

Also we will have in course of construction a Brick road on Lakewood avenue, being 400 feet in length and 12 feet in width on each side of a car line. This brick road will be built on a well rolled clay foundation, with one inch sand cushion, and will be well grouted with cement to make it water-proof.

On Macon Drive, a short distance from the brick job, we are building a "sand-clay" road with stone gutters, this work being under the personal direction of Prof. Chas. M. Strahan of the University of Georgia, who is known far and wide for his top soil roads.

These three particular roads will be in progress while the Road Congress is in session here and the commissioners of Fulton county will be only too glad to show as many delegates as possible, these and other roads in our county.

We are looking for a great crowd and a very profitable session of the congress, and everything we can do in Atlanta to make the congress pleasant and profitable, we are trying to do.

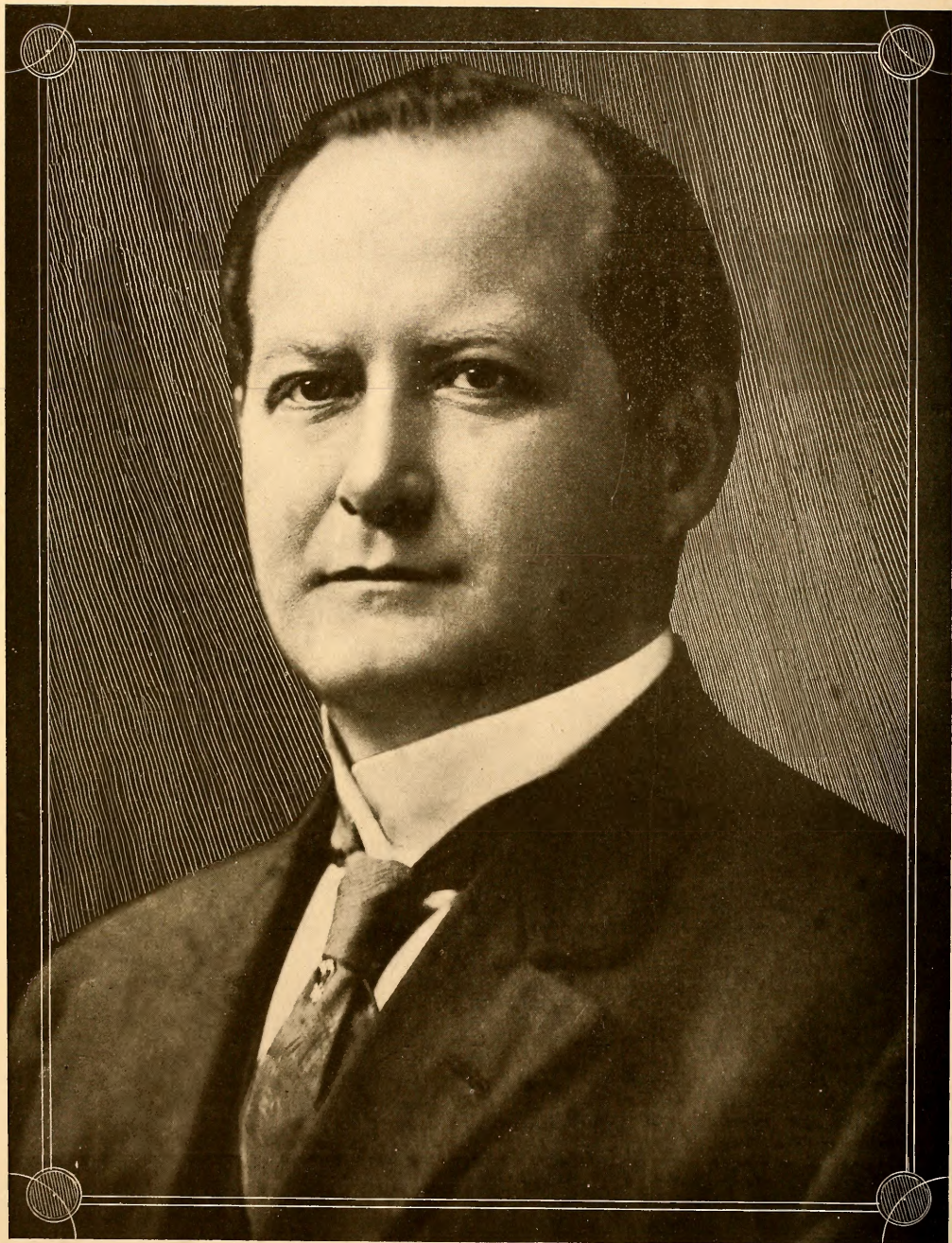
The county has paved some forty or fifty miles of city streets inside the city in the past ten years, being mainly asphaltic concrete, and bitulithic, both mixed methods.

The new \$1,500,000 county court house is just now completed and occupied and that will be worth going through, and should certainly be interesting to county officials who will be present.

Also the city's new sewage purification plants which the county forces helped to build, will be very interesting to engineers and all city officials. There are three of these Inhoff system plants, and experts from all over the United States and Canada have pronounced them a great success.

The city of Atlanta contemplates the expenditure of \$40,000 for the construction of a roadway through Piedmont park and a bridge connecting the north and northeast sections of the city.

Elbert and Madison counties, Georgia, will build a county line bridge over Broad River near Moore's Ferry. The bridge will be 484 feet long.



GOVERNOR JOHN M. SLATON, OF GEORGIA

Road Progress in Georgia

By HON. JOHN M. SLATON

Governor of Georgia

UNDER the stimulus of the Good Roads Movement now prevailing throughout the Southern states, Georgia has made more progress in highway construction during the last six years than in three times the same period in her history before. Two factors have contributed powerfully to the success of the movement in this state, namely, the development of the automobile industry and the use of convict labor.

With the expiration of the leases, under which Georgia formerly hired out her convicts to private individuals, and with the abolition by statute of the leasing system, the state prisoners were assigned to counties desiring them for labor upon the public roads. This was early in 1909. There were last year, according to the report of our prison commission, 5,752 felony and misdemeanor convicts at work on the highways in 123 of the 148 counties of the state.

The use of convicts is not compulsory with the counties. They are furnished free of charge by the state but they must be maintained by the counties employing them. Accordingly, a few of our counties, not feeling in a position to undertake the burden of maintaining convicts, are still endeavoring to keep up their roads under the old system with statute and hired labor, and have never availed themselves of the opportunity of obtaining from the prison commission their pro rata share of convicts. Others have taken convicts only to lease them to more prosperous counties.

In a large number of our counties, however, the good roads movement has grown so strong that they are now working all of the felony convicts which they can secure from the state in addition to their own misdemeanor convicts. Some of them would be glad to work twice as many men as they now have if they could get them.

Under our present system of labor, it would be impossible to estimate more than roughly just how much is being spent in Georgia annually for road improvement. If we figure the money value of the convicts, the cost of their maintenance, the outlay for road machinery and the expenditures of those counties which do not use convict labor, the total would not be far from five million dollars per year. This is within about a million dollars of the annual revenue of the state raised from all sources of taxation. I do not know of another Southern state that is spending so much as this on road building.

There are in Georgia, according to the latest report of our geological survey, approximately 85,000 miles of public roads. The great bulk of this mileage must still be classed as unimproved. There are, however, about 5,000 miles of improved roads, a considerable part of which would compare favorably with the highways in any of the most progressive sections of the country.

Naturally, the greater portion of this improved mileage is in the city counties, thanks to their superior wealth and better facilities for handling convict labor. Still, many of our more progressive agricultural counties have felt so deeply the importance to their prosperity of good roads that they have not been willing to be left behind, and have built and are continuing to build very creditable road systems.

There are, of course, some defects in our system of building roads by counties with convict labor that will have to be worked out in time. Chief of these is the lack of coordination among the county officials who manage the convicts with the resultant failure to take into consideration a comprehensive system of road building for the state at large. Highway construction in Georgia is also complicated by the great variety of our soils, which necessitates the employment of different materials and methods by road engineers in the northern, middle and southern sections of the state.

No complete account of the Good Roads Movement in Georgia could be given without some mention of the part played by automobiles. As this means of transportation has ceased to be the plaything of the rich, has adapted itself to manifold uses and has been brought within the compass of men in moderate circumstances, it has proved a more and more important factor in road development. Whenever automobiles come into general use in a county, good roads are sure to follow.

It would be a work of supererogation to rehearse in such an article as this the benefits to be derived from good roads. These are evident to all. Good roads bespeak progress. They are a certain token of an aggressive and enterprising community. There is no more influential factor in prosperity than they. They constitute the best advertising which a section can have.

Georgia people are alive to all of these advantages. We have not yet reached the high tide of the Good Roads Movement, and will not, I trust, until we have readily passable highways penetrating into every inhabited district of our Southern land.

Road Meeting in Columbia County, Ark.

A good roads meeting was held a few days ago at Village, a small town in Columbia county, Ark., 12 miles from Magnolia. There is in contemplation a first-class gravel road between these two towns and State Highway Engineer Carter and W. B. Owen, secretary of the commission, were down from Little Rock to help the project along. A. S. Kilgore, member of the highway commission; A. D. Pope, Walker Smith and J. E. Hawkins joined Mr. Carter and Mr. Owen at Magnolia and accompanied them to Village. There they met a large number of citizens, and Engineer Carter presented plans and specifications for a proposed road from Magnolia to Village. The survey for this proposed road was made by Mr. Carter and Mr. Hight some three weeks ago. The formation of an improved district has been undertaken for the purpose of building this road, and petitions will be circulated immediately.

The Little Rock-Hot Springs Highway Association, now engaged in building a fine highway between those two thriving Arkansas towns, is pushing the work rapidly. A few days ago the fourth 20 per cent of funds subscribed for the road was called for. They expect to have the new highway finished in time for the State Fair at Little Rock Nov. 16.

Importance of the American Road Congress to the State of Georgia

By C. M. STRAHAN

Professor of Civil Engineering, University of Georgia

Every road commissioner and every city councilman and every engineer in Georgia and the surrounding states should not fail to understand the importance of the American Road Congress meeting for next November which, through the well directed energy of the Fulton Commissioners at Detroit, was induced to hold its 1914 meeting in the South and in Atlanta.

Any one who attended the Detroit session with its 4,000 interested delegates from all over the United

J. E. Pennybacker who in behalf of the Office of Public Roads has promised a special degree of assistance to the Atlanta meeting, can doubt for one moment that next November will see 5,000 delegates on hand and the most complete display of road making material and equipment ever assembled in the country.

No Georgia road or street official can afford to miss this notable gathering and the instructive exhibits which will bring together the membership of more than twenty-seven of the largest national and sectional road associations, and all the road officials from highest to lowest of each state of the union, and for which business men freely expend many thousands of dollars in order that a complete display may be made of everything which the road and street builders can need.

The American Road Congress is not the advocate of any special highway project or type of road. It seeks to serve as a great clearing house of road ideas, of road equipment and of road materials where annually every one interested can come and see what is being done in every phase of road and street construction. We do not hesitate to advise our Georgia people and business men to give a hearty support to this meeting. Its inspiration will be felt in a thousand ways upon Georgia's road progress both in city and country.

Preparing for Alabama Good Roads Convention.

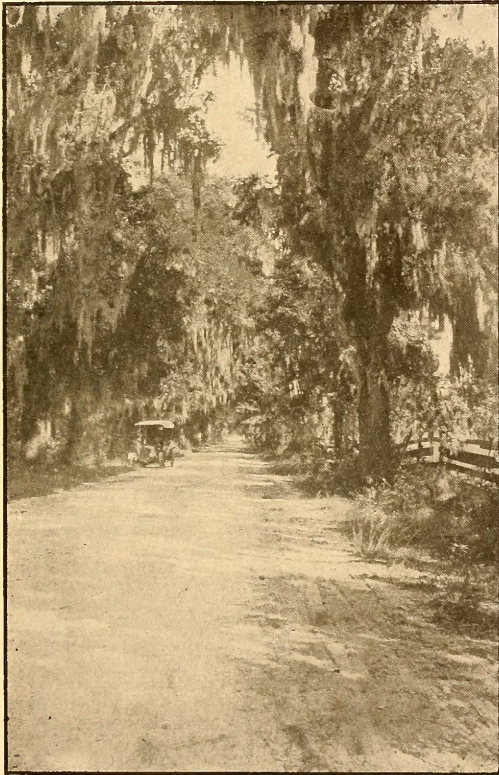
The convention committee of the Montgomery Chamber of Commerce is busy making preparations for entertaining the annual convention of that organization this month. Four special committees were named to direct the activities of the convention as follows:

Reception committee, Duncan May, chairman; hall and headquarters, Luke Thompson, chairman; program and badge, Fred B. Shireman, chairman; entertainment, J. F. Stukenborg, chairman.

Governor Emmet O'Neal, Mayor W. A. Gunter, Jr., and Duncan May, president of the Chamber of Commerce, have joined in a letter to a thousand prominent men of the state inviting them to attend the convention for the promotion of better roads.

During the last fourteen months Bell county, Texas, has come to the front with a rush in the construction of good roads. During the period eleven road districts have been organized that cover practically every Justice precinct in the county and comprise nearly three hundred and fifty miles of graveled roads. Bonds to the amount of \$1,208,000 have been voted in these districts with which to pay for the improvements. Large portions of the roads have already been completed and are in use, while several hundred miles of additional road are now in course of construction, and within twelve months it is expected that all will be completed.

Houston, Texas, has contracted for a re-inforced concrete bridge across White Oak Bayou at the foot of Taylor street, to cost \$12,000.



Gravel Road near Savannah, Ga., showing the big liveoaks that line the highways around Savannah, festooned with Spanish moss.

Photo by U. S. Office of Public Roads

States and Canada, with its 30,000 square feet of material and machinery exhibits, with its full co-operation of the Office of Public Roads, cannot fail to feel the educative value of this mammoth gathering and the distinct compliment and opportunity involved to Georgia.

Any one who knows Mr. Chas. P. Light, the splendid organizer and human dynamo who has charge of the Congress at the coming Atlanta meeting, and Mr.

A Highway Commission For Florida

**An Interview with Mr. J. P. CLARKSON
Secretary Florida State Good Roads Association**

"Florida needs a state highway commission, and the members of the Florida State Good Roads Association are pledged to do all in their power to secure the enactment of a law creating such a commission at the next session of the state legislature," said J. P. Clarkson, secretary of the Florida state association, on his return to his home in Jacksonville from a vacation trip spent in North Carolina. While in North Carolina he spent some time investigating road conditions. He

"Improper construction of roads.

"Rapid deterioration of roads which have been properly constructed, due solely to the lack of proper supervision or maintenance.

"Short sections of roads built in remote parts of the state.

"No standardization of road construction and maintenance.

"Dissatisfaction among people who are paying for the roads.

"A general dissatisfaction with engineers due to failure of county authorities to properly protect the roads which have been properly built by the engineers.

For a State Commission.

"In pointing out the benefits to be derived from having a state highway department or commission, Dr. Pratt stated that he had every reason to believe that the enactment of the state highway commission bill endorsed by the North Carolina Good Roads Association would bring about the following results:

"1. Provide proper supervision for construction and maintenance of the public roads.

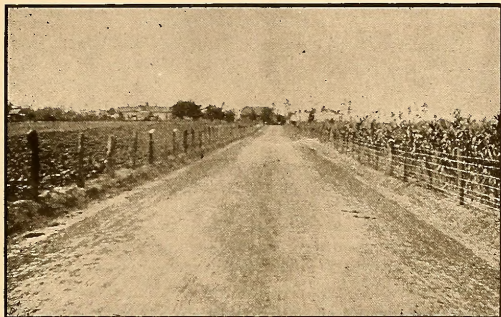
"2. Eventually give the state and counties a proper system of highways.

"3. Standardize road construction throughout the state.

"4. Enlighten the local officials in all matters pertaining to better road conditions.

"5. Provide free engineering advice to the counties.

"6. Eventually save to the farmers \$8,000,000, the



A Country Road in Colquitt County, Ga.

is enthusiastic over the excellent roads leading out in all directions from Asheville and praises most highly the work of the North Carolina state Good Roads Association.

"I found that while North Carolina has not at present a state highway commission, there is a strong sentiment in favor of such a department of the state government," said Mr. Clarkson, "and I was assured by Dr. Joseph Hyde Pratt, state geologist and secretary of the North Carolina Good Roads Association, that there is every likelihood of the enactment of a law creating such a commission when the next session of the state legislature meets.

"In talking with Dr. Pratt, who is well known in Jacksonville, having visited this city several times and delivered at least two addresses here, I was struck with the similarity of conditions existing in North Carolina and Florida. Dr. Pratt pointed out that counties and townships in his state voted large amounts for road purposes, the expenditure of which is not under competent supervision in all cases, and there is no provision for proper maintenance—consequently large sums are wasted and thrown away each year. Also that on account of the inadequacy of the road laws there is no effort being made on the part of local officials to embody in the road improvement plans the ultimate perfection of a state and county system of connected thoroughfares.

Results of System.

"The following summary, given by Dr. Pratt, sets forth very clearly the results of the system, or lack of system, that has been followed, and I am sure that everyone who has looked into the matter will see that the same results obtain in nearly every section of Florida.



A Clay Road at Talbot, Ga., showing ruts after two weeks of dry weather

amount it is costing them to haul their products to market.

"7. Put the state abreast of thirty-four sister states which have highway departments.

Would Afford a System.

"Too much emphasis cannot be made," said Dr. Pratt, "of the fact that the proposed state highway commission law would give to the state a system of roads that would connect one county with another, and not broken stretches of good and bad roads."

"I secured from Dr. Pratt," said Mr. Clarkson, "a

copy of the proposed state highway commission bill, and I will turn it over to Judge H. B. Phillips, chairman of the legislative committee of the Florida State Good Roads Association. In fact, I have arranged to secure copies of the laws of every one of the thirty-four states that have a state road department and these will be carefully considered by the legislative committee. The committee is empowered by the state association to draft a bill to present at the next session of the state legislature and the members of the state association feel that such a bill will have a most excellent chance of being favorably reported in both branches of the legislature and that it will be enacted into law.

Perhaps National Aid.

"It is well known that there is little doubt of congress passing at the present session or the next session at the latest, Senator Bryan's bill for government aid in road construction or a similar measure. It is also true that no state can obtain the benefits of such road appropriations from the national government unless the state has an adequate highway department through which the funds can be appropriated and expended.

"H. B. Varner, of Lexington, N. C., editor of Southern Good Roads, a monthly magazine devoted to highway and street improvement, and also president of the North Carolina Good Roads Association, who attended the 1914 convention of the 1914 convention of the Florida Good Roads Association at Gainesville last April, points out that to accomplish the results desired and be in position to obtain to the fullest extent the appropriations to be made by congress the legislature of 1915 should establish a state highway commission which should be non-political and non-factional, and

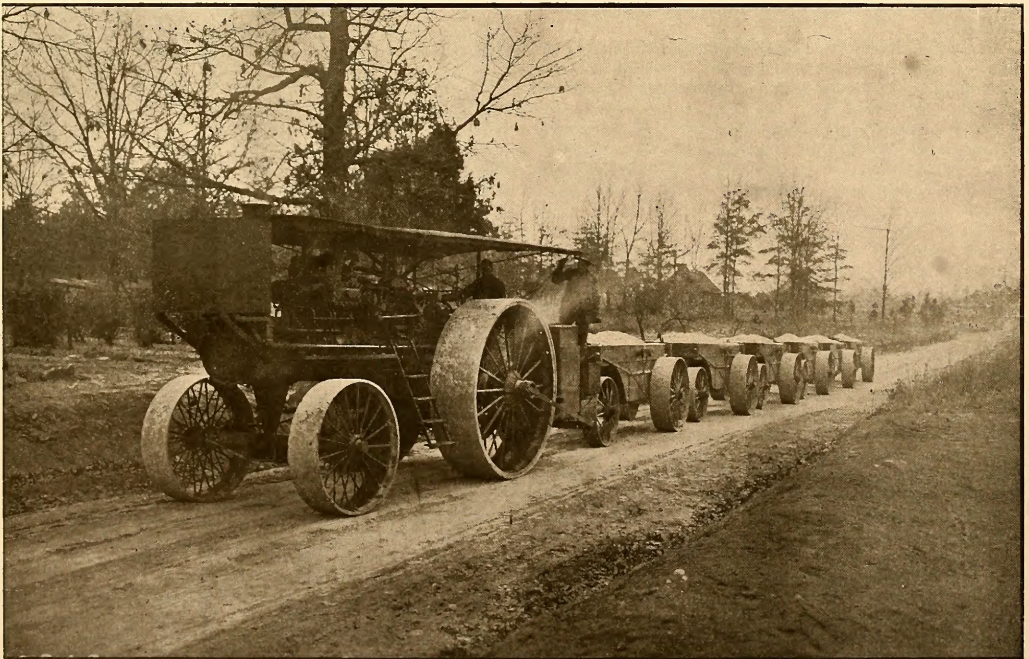
whose work should be entirely for the best interests of the public roads of the state.

Maintenance Fund, Too.

"Another matter dwelt upon by President Varner in his magazine, which applies especially to Florida, is for counties to provide a maintenance fund with which to repair roads after they are built. He says that no county should be permitted to issue bonds with which to build public roads unless there is inaugurated in the act authorizing the bond issue a section making it obligatory upon the county to provide a maintenance fund with which to maintain and keep in repair the roads after they are built. If such a provision was made the people would be much more favorably inclined to bond issues for road work than most of them are at the present time.

To Start a Campaign.

"The Florida State Good Roads Association is about to start a campaign of education throughout the state to arouse sentiment in favor of a state highway commission," said Mr. Clarkson in conclusion, "and I certainly hope that the press of the state will assist us, as it always has in the past. The association has no funds except those derived from membership dues, and as the dues are only \$1 a year, there is never but very little money in the treasury. Every advocate of good roads in Florida should become a member of the association. It is not necessary to make application for membership on any prescribed form or blank. All that is necessary is to send your name and address, accompanied by \$1, to the secretary. Just address your letter with \$1 enclosed, to J. P. Clarkson, secretary Florida Good Roads Association, Jacksonville, Fla., and you will receive a certificate of membership for the current year."



Traction Engine and Train on U. S. Object Lesson Road in Fulton County, Ga., near Atlanta. Photo by U. S. Office of Public Roads

Natural Sand Clays in North Carolina--- Piedmont Belt

By JOHN E. SMITH

Instructor in Geology, University of North Carolina

To a limited extent natural sand clays, though in many places undiscovered, exist in nearly every county in the Piedmont. Their occurrence is quite general in the areas of granite rocks which embrace the following counties in North Carolina: Mecklenburg, Gaston, Cabarrus, Rowan, eastern and southern parts of Iredell and Lincoln, Davidson, Guilford, Alamance, Caswell, Granville, Vance, Warren, Franklin and Wake.

This material is derived from igneous and metamorphic rocks by disintegration and decomposition. Probably the most common sand-clays result from the breaking down of granite which consists of quartz and orthoclase felspar with or without smaller quantities of several other minerals. As the granite weathers, the quartz becomes sand and quartz pebbles and the other minerals change to clay. A "decomposed granite" is therefore a typical one of the natural sand-clays of the Piedmont and will be taken in this paper for consideration.

A Generalized Section.

| | Thickness |
|--|------------|
| 1. Soil at surface, red to gray and black (humus) | 1 to 2 ft. |
| 2. Subsoil, fine, somewhat compact, red to yellow clay | 3 to 10 |
| 3. Clay, coarse and lumpy, rotted rock with some sand | 5 to 20 |
| 4. "Gravel," pebbles of quartz and orthoclase, with sand and clay | 10 to 20 |
| 5. Fragmental rock, partly decomposed angular fragments up to 2 or 3 inches in diameter | 5 to 10 |
| 6. Granite, rock masses, angular and broken, much coarser and less decayed than those in No. 5 | 5 to 10 |
| 7. Solid granite, "bedrock," "country rock." | |

Since clay is predominant near the surface, shown in the generalized section, decreasing somewhat uniformly as the depth increases, and since the relative amount of sand and rock increases gradually with the depth, there is a level somewhere in the pit at which these materials occur in any desired proportion. The right quantitative relation of the two constituents used in building natural sand-clay roads is found in No. 4 of the section above.

The figures of the first column represent thickness in the eastern Piedmont, where the depth of No. 4 from 10 to 20 feet; those of the second column apply to the western counties where this layer is sometimes forty feet or more below the surface. The "gravel" of No. 4 may be found at the surface on low hills between the branches of streams or along the sides of the valleys near the tops of the hills or slopes. Prospecting in such places as these will generally result favorably if the underlying rock produces a good sand-clay.

Fortunately these are desirable locations for they insure perfect drainage in the pit, ample facility for disposition of the overburden, and are near the upland

peneplain on which the principal roads are constructed. Productive locations can generally be found in pasture lands or woodlands and it is therefore unnecessary to open a pit in a field or to remove gravelly soils from cultivated areas.

Volumetric Tests.

In the University of North Carolina the method used by classes in geology 8A, road materials, in determining the relative proportions of the constituents in natural sand-clays is essentially as follows and some of the results are given below:

1. Measure out about 1,000 cc of the material in a conical graduate. Tap the glass with the hand for a few minutes and record the amount.
2. Grind the measured material as fine as possible with mortar and pestle. (Road traffic will provide more wear than this.)
3. Wash the "gravel" thoroughly in shallow pans and allow it to dry. Keep the water containing the clay, allow it to settle (or flocculate it), decant, measure, and report the reading.
4. Put the dry washed sand in the flaring graduate, tap firmly with the hand, and pour from a measured quantity of water into the vessel, permitting it to run slowly down the glass on one side until the voids are filled. Label the material and record the amount of water used.
5. Compute the percentage of voids, the amount of excess clay, and the additional percentage of stream sand necessary to utilize the excess clay.
6. Tabulate results as follows:

TABLE 1.

| No. of test | Original volume cc | Clay washed out cc | Sand remaining cc | Water filling voids cc | Volume of voids % | Excess clay cc | Stream sand necessary % |
|-------------|-----------------------|-----------------------|----------------------|---------------------------|----------------------|-------------------|----------------------------|
| 4 | 1,200 | 330 | 800 | 225 | 31.9 | 75 | 17.3 |
| 10 | 2,100 | 760 | 1220 | 452 | 37. | 308 | 39.6 |
| 11 | 800 | 263 | 650 | 212 | 32.6 | 51 | 17.7 |
| 12 | 1,000 | 125 | 805 | 243 | 30.2 | 0 | 0 |

These samples were taken from a pit at Chapel Hill; No. 10 from a high elevation in it. No. 12 was dug from the floor at the lowest level in the pit.

Stream Sands.

When a stream is cutting valleys in an area like the Piedmont, the sand and clay are washed away and separated by the water, the former usually being deposited in bars along the lower course of the stream. These are known as stream sands and are frequently used in road building. The results of several tests to determine the percentage of voids in stream sands are given below:

TABLE 2.

| No. of test | Volume of sand cc | Water filling voids cc | Volume of voids % |
|-------------|----------------------|---------------------------|----------------------|
| 2 | 1,000 | 366 | 36.6 |
| 4 | 1,000 | 320 | 32. |
| 9 | 1,000 | 386 | 38.6 |
| 10 | 750 | 275 | 36.6 |



High Type of Macadam Road Near Atlanta, Ga.

No. 2 is sand from Bolin's Creek. No. 4 is a true gravel, being that which was retained on a screen having square meshes five-sixteenths of an inch each way. No. 9 is Morgan's Creek sand. No. 10 is from the same locality as No. 9, but was closely compacted in the graduate. All of the estimates were made with moderately dry sand.

Principle and Its Application.

"The proportion of sand and clay in the best sand-clay road should be such that there is just a sufficient amount of clay, and no more, to fill the voids between the grains of sand when these grains are touching each other. The clay is the binder that is to hold the grains of sand in place, and there should not be any more than is sufficient for this purpose."

From the results given in the above tables, it is seen that in many instances the amount of clay present in the natural sand-clay is too large. This last column in table No. 1, gives as a percentage the number of loads of stream sand to be mixed on the road with 100 loads of the natural sand-clay. In No. 4 of table 1, for example, the amount of stream sand (voids, 36 per cent) necessary for use with 75 cc of clay is 208.3 cc., or 17.3 per cent of 1,200.

Test of samples of the material taken from various elevations in the pit should be made to determine the exact level at which the correct percentages of sand and clay occur. Loads removed from each level in the pit higher than this, contain a larger proportion of

clay and should be put together on a separate part of the road. The material from each level in the pit should be tested and should have the proper amount of clean sand mixed with it on the road to use as a binder the excess clay it contains.

A careful examination of the washed sand and pebbles shows that nearly one-third of it is feldspar (orthoclase) which will, in time, decay forming clay. This will appear as mud when the road is wet and its occurrence should be the signal to apply additional sand, if a hard surface is to be maintained on the road.

The department of geology of the University will make a limited number of tests of sands and natural sand-clays from various parts of the State, if samples are sent by parcel post. They should be accompanied by full information as to source of material, its location and depth in the pit, ownership, etc.

Summary and Conclusions.

Natural sand-clays occur in most parts of the Piedmont belt in North Carolina. Careful search on the valley slopes in uncultivated areas will usually find locations where pits may be opened. "Gravel" and coarse sand have a smaller percentage of voids than finer sand. When more clay is present than necessary, enough clean sand should be added to use all of it, and a better grade of material can be found at a lower level in the pit.

Public Roads and Public Schools

By DR. JOSEPH HYDE PRATT

State Geologist of North Carolina

Charles Sumner once said, "The road and the schoolmaster are the two most important agencies in the advancement of civilization." This is well put, as the efficiency of the schoolmaster, or public school, is closely allied with the condition of the public roads of the neighborhood, especially in the rural districts. The relationship between the public roads and the public school may be summarized as follows.

Good roads well maintained make it possible to have:

(1) Larger school districts, with more money, larger and better equipped houses, and the possibility of having a graded school rather than the old time one-room school house with one teacher teaching all grades.

(2) Through the agency of good roads, school attendance will increase from 50 to 75 per cent, for parents along a good road could employ a wagon or carriage to transfer the children to and from school, thus making it possible for them to attend during all kinds of weather without danger to their health.

(3) Along good roads you will find better kept homes, more attention to cultivation of flowers around the home, better social life, and happier rural communities.

In fact, a state's rating educationally may be said to be directly dependent upon the condition of its country roads in so far as its rural communities are concerned. Statistics have shown that in five states with a large percentage of bad roads, the average school attendance is 59 per cent; and in five good road states, the attendance is 78 per cent. In four bad roads states—Arkansas, Missouri, Mississippi, and North Carolina—there are over 8,000,000 people, and about 400,000 native born white people in these states cannot read and write. In calling the first good roads convention ever held in the State, our "Educational Governor," Charles B. Aycock, spoke as follows:

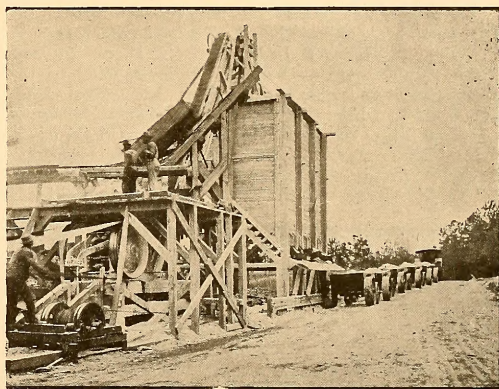
"We can never educate the children of North Carolina unless we shall have built such roads as will bring them close together whether they live within a few or many miles of each other." He further said, "If we expect to get the power of combination and unity, we must make better roads. We have determined to educate all the children of the State; in order to attain that desirable end we must have larger school districts; in order to have these we must put the roads in such condition in the country that the children can attend school from larger distances."

In connection with the "Good Roads Days" set apart by Governor Craig in November, 1914, a pamphlet was issued by the State Board of Education and distributed largely among the public schools, giving certain information and data regarding the public roads. In his letter to the county superintendents and boards of education, Mr. Joyner says:

"To become permanent, all great movements for civic and industrial improvement must begin with the teaching of the children in the school. The rising generation should be taught the necessity and importance of good roads in North Carolina; should be brought to see the relation of these to the future comfort, progress and prosperity of the State along all lines. Nothing is more essential than good roads for increasing the efficiency of our schools. Consolidation and transportation, so necessary for larger schools;

larger taxation areas; better houses and equipment; more and better teachers, with better organized, more advanced and more practical courses of study, for better preparation for life and its daily occupations, are practically impossible without good roads.

The National Education Association, made up of eminent educators, thoroughly familiar with conditions existing all over the country, have studied this subject and they state that the solution of the educational problem of the rural district is to be found in the consolidated township school, and that, instead of having eight or ten isolated school houses placed at intervals at the cross roads throughout the township—bleak, dreary, and uninviting—there should be one centrally located graded school at the most convenient place, with provision made to get the children to and from school. To accomplish this, good roads are absolutely necessary. It is also the idea of those who are now working for civic advancement in the rural districts,



Modern Crushing Plant and Traction Engine and Train on U.S. Object Lesson Road near Atlanta, Ga.

that the school house should be the centre for neighborhood gatherings; that it should have a library and reading room to be used not only by the children but also by the parents; that lectures should be given at the school house and the men of the community encouraged to gather and discuss questions of community, state, and national import.

It was General Grant who once said that the solution of the problem of country life was to be found in good roads and good schools. Because of the lack of good roads in North Carolina, as well as other states, the trend has been for some time from the farm to the town and city, and the rural communities have been constantly losing their strongest asset—the brightest and strongest of their youth. This drain upon the rural communities is having far-reaching results, affecting all of our citizens whether in the country or in town. When the intelligent portion of a community is gone, the farm lands are turned over to the less intelligent, who work the farms with the idea of getting what they can with the least expenditure of energy and money. It is an historical fact

that when tenants begin to have charge of lands there is a quick and constant decrease in farm products. With the advent of good roads through any such communities and the easy facilities offered by them for social intercourse and for marketing farm products, the more intelligent youth will see the abundant opportunities for engaging his activities in an occupation which offers not only success and prosperity, but happiness on the farm. The rural educators are beginning to encourage young boys and girls to learn the scientific principles of agriculture, poultry raising, dairying, etc., and this movement can be encouraged and made more effective with the building of good roads.

The rural free delivery has become an established fact among our rural people and has had a potent educational influence. The Postoffice Department at Washington, however, has made certain rules with regard to the discontinuance of routes if the roads along these routes are allowed to become impassable or are not kept up with some degree of efficiency. If, therefore, we are to have full benefits from the rural free delivery system, we must have not only our systems of main country well surfaced, but a system of secondary dirt roads well shaped and well maintained.

If, then, education means liberty and if poor roads mean illiteracy or worse, as we are shown by statistics, have we a right not to build good roads even if they would not pay for themselves well within the generation that builds them? To quote Professor N. S. Shaler, of Harvard University, "Perhaps the best of the many measures which may be applied to the United States in order to determine the degree of advancement to which they have attained, may be found in the condition of their common roads. On the character of these ways intimately depends the ease with which the people secure neighborly communication as well as advantageous relations to the outer world. It

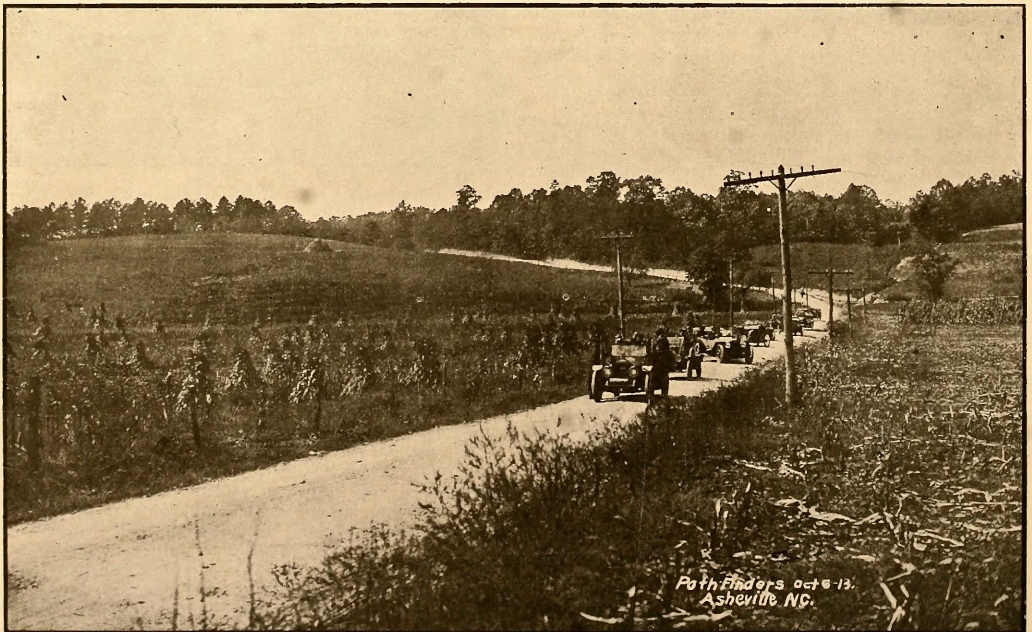
is doubtful, indeed, whether a sound democracy, dependent as it is on close and constant interaction of the local life, can well be maintained in a country where the road ways put a heavy tax on human intercourse.

Buncombe County to Have Well Kept Roadside.

Recently the county board of health of Buncombe County passed a county-wide ordinance prohibiting the throwing of trash and garbage along the roadways and forbidding the erection of a hogpen within 200 feet of a public road. This ordinance looks to the improvement of roads leading to Asheville and should result in the removal of a nuisance which now exists on many of them. The sheriff's department has been given orders to rigidly enforce the new enactment.

A similar law could be passed and enforced with beneficial results in a great many counties. In many of our counties farmers and others hauling produce to market are obliged to camp while en route; and in many places where such camps are made along the roadside, refuse of all kinds is left in and along the side of the road, which most decidedly mars the beauty of the road and is an offence in many other ways. It is recognized that it is necessary for these camps to be made, but it would only take a small additional time of the campers to clean up and burn or bury the refuse before they leave. It would not be a bad plan for the county commissioners or other commissioners that are in charge of the public roads to arrange and designate certain places as camping sites, and pass certain regulations in regard to their use.

Yadkin and Forsyth counties, N. C., have contracted for a bridge across the Yadkin river, connecting the two counties. The contract price is \$23,349.



On one of the fine roads of Buncombe county, North Carolina.

Road Building Materials in Florida

By CHARLES E. FOOTE

SEVERAL essential factors must be considered in the construction of city streets and country roads if the greatest value is to be secured for the money expended.

One of the first, and the really dominating factor, is competent engineering. The city or community, which, by reason of a false notion of saving money, employs a cheap and incompetent engineer will invariably find, in the long run, that the inferior services rendered have proven very expensive, by reason of unnecessary amounts of money spent, and inadequate construction designed and carried out. The best engineering services obtainable are always the cheapest in the end.

Concrete Foundations.

Whatever surface is to be laid on a street or road, the foundation must be practically the same. Concrete foundations are necessary for practically every pavement that may be laid on the principal streets of cities, and on some country roads of unusually heavy travel.

But there are different kinds of concrete, and it is the business of the engineer to make a careful survey of local materials with a view to finding that which can be utilized at the least cost. In or near almost every community can be found some material which will make up most of the mineral aggregate for a concrete which will make satisfactory foundations. In the absence of a supply of stone other materials may be utilized. Washed gravel, or creek gravel makes an excellent aggregate for concrete; coarse sand is sometimes used, though it usually requires a larger proportion of cement; blast furnace slag is usually considered satisfactory; and cinders, and a variety of other materials, after proper tests have been made may be utilized for the purpose. If neither the municipality nor the engineer have the facilities for making the tests, the United States office of public roads will cheerfully make them, without cost, except that of the transportation of the samples to and from Washington.

For country roads, and for residence streets of cities, where concrete may be considered necessary, a gravel which has good cementing qualities makes a good foundation. Broken stone may be used of a softer quality than would be proper in the surfacing material, especially if the subbase be carefully compacted with a heavy roller.

Available Road Material.

In some sections of Florida there appears to be a most excellent opportunity for a thorough survey to determine the existence of available road materials. In Dade county (Miami) there is a limestone which makes most excellent foundations, but is too soft for a wearing surface. Probably careful experimentation may develop some other material which, with an asphalt binder, will make a satisfactory surfacing material. As a matter of fact, some experiments have already been made along this line.

In Marion county, near Ocala, a ledge of extremely hard, flinty limestone has been reported. This ledge is said to have been known for years, but by reason of its hardness and lack of cementing qualities, the stone adds greatly to its value. There are probably hundreds of deposits of road material scattered over the

state, and a scientific search will bring them to light, and make them available.

In the surface, only the best materials should be used, because it is on the surface that the entire wear becomes effective, and the question of cost must be considered, not from a standpoint of the original investment, but on a basis formed by the addition to that original cost of the maintenance for a period of ten or twenty years. The use of inferior materials not only makes a less satisfactory street, but doubles or triples and sometimes quadruples the annual cost of maintenance.

Oil-Clay Road at Eustis, Florida.

A little stretch of oil-clay road at Eustis, Florida, is attracting a great deal of attention throughout Florida. The road is something new for Florida and the south and it is said that citizens of Eustis are claiming that it is the best of all roads.

Many pilgrimages to Eustis have been conducted from surrounding towns and counties. A party of Tampa autoists visited Eustis and examined the road. Not many days ago about 40 automobiles from Arcadia, Zolfo, Wauchula, Haines City, Bartow and other towns in Hillsborough, Manatee and adjoining counties, journeyed to Eustis and the citizens of the town vied with each other in extending a welcome to the visitors, and their hospitality was unbounded. The members of the party who took a little money with them to pay expenses, were told that their money would not pass in that city, and the hospitality was so unselfish and unstinted, that the visitors were sorry that they had not gone penniless.

Having gone to Eustis for the purpose of studying good roads, the delegates at once began the inspection of those on exhibition of oil-sand. The demonstration and careful examination resulted in convincing the visitors that the Lake county roads are very superior in many respects. The Eustis road that was examined is three inches thick, eight feet wide and after constant use for two years, appears to be in better condition than when first built. It appears to improve through use, certainly for a period at least.

Samples were also shown from the roads built in Massachusetts by the State Highway Association, and through state aid. It is considered a great success there, where the sand that is used for the purpose, is much inferior to the sand in Florida. A better road can, therefore, be built for the same money in Florida than can be built further north where the conditions are different.

A careful estimate by committees of inspection and engineers when applied to conditions in Florida, shows that a road three and one-half inches thick, and eight feet wide can be built for \$2,500 per mile almost anywhere in this state.

West Virginia will be represented at the Fourth American Road Congress which will be held in Atlanta, Georgia, during the week of November 9th, by Mr. A. D. Williams, chief road engineer, who will present a paper on "Grades and Excavation." The discussion of this subject, a most important one, will be opened by Mr. William J. Roy, state highway commissioner of Washington, and should attract the attention of all engineers and delegates present.

What is a Post Road?

By JUDGE J. M. LOWE

President National Old Trails Association

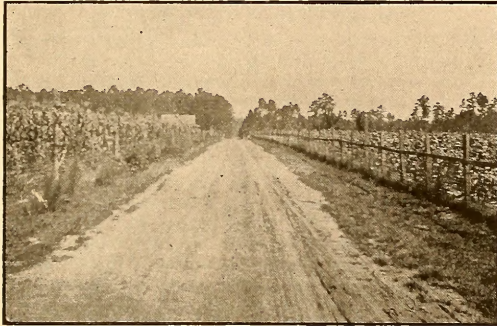
THE National Democratic Platform adopted at Baltimore in 1912 contained the following clause: "We favor National Aid to State and local authorities in the construction and maintenance of Post Roads." Evidently the author of this declaration knew little of the subject about which he was writing, and had in mind the words of the constitution which authorizes congress "to establish Post Offices and Post Roads," and he thought it safe ground to keep "within the letter of the Constitution." Justice Story, in his

to all human experience or intellectual contemplation up to that time, and hence do not come within the unambiguous meaning and purpose of that instrument.

There are 2,199,646 miles of public roads in the United States, and 1,042,477 miles of these may be rural free delivery routes. Assuming that these delivery routes are the "Post Roads" contemplated in the Constitution then there are 1,157,189 miles of public roads unprovided for, which although they may come within the exact words of the Constitution, would receive no benefits from the bill above alluded to, and if that was the meaning of the platform, this million miles of roads and over was left out and not considered by the platform builders. Moreover, a rural free delivery route is not necessarily a public road. It may be a private road, or no road at all, if the Congressman has a constituency so rural as not to live on a road. Besides, these routes follow the fluctuations of population, and are therefore constantly being revised. What is a free delivery route today may be abandoned tomorrow. Again, many of these delivery routes will follow a neighborhood road up to a certain house or small settlement and end there, although the road may extend miles beyond. There are 48 of such "dead ends" of delivery routes in Jackson county Missouri.

It is clear that if the national revenues are to be appropriated to the construction and maintenance of the public highways generally, congress must look for authority to other Constitutional provision than the clause empowering it to establish Post Offices and Post Roads.

But, congress has full and complete authority to appropriate the national revenues to "National purposes"



A Sand Clay Road in Lowndes County, Ga.

great work on the Constitution, lays down the following rule of construction:

"Look to the nature and objects of the particular powers, duties, and rights with all the lights and aids of contemporary history, and give to the words of each just such operation and force, consistent with their legitimate meaning, as may fairly secure and attain the ends proposed." Story's Constitution, Sec. 405a.

The Constitution was adopted in 1787. What was a Post Road at that time, which Congress was authorized to establish? Evidently any road over which the mails were carried to the Post Office. At that time there was not a steamboat or a railroad in the world, and of course no such thing as "Free Delivery Routes." Allowing for great flexibility in construction, it is certainly stretching it some to have these words of plain, unambiguous meaning at the time they were written into the Constitution, to cover "Free Delivery Routes," first established in 1893, as was proposed in a bill defeated in the present Congress. Congress has express authority, under this provision to "establish Post Roads," that is, roads leading to the Post Offices, where everybody went to get the mail, and no other. Justice Cooley includes railroads and steamboats in his definition of Post Roads, for, although not in existence when the Constitution was adopted they now fill the purpose had in view, as roads upon which the mails were carried from Post Office to Post Office. "Star Routes" come within the exact definition of Post Roads but are daily becoming of less importance. "Free Delivery Routes" are routes over which the mails are carried from the post office, and could not have been contemplated by the Constitution, as they nowhere existed at the time of its adoption, and their purpose is exactly opposite



A Flooded Sand Area, near Talbotton, Ga.

under the commerce clause of the Constitution, such as navigable rivers, harbors, etc., and such roads as are interstate, or national in character. This is no longer an open question. It has been so held by an unbroken line of decisions, See 148 U. S. Rep. 241; 148 U. S. 153; 153 U. S. 530; 135 U. S. 658.

In the case of California vs. Pacific Railroads 127 U. S. 1-39 the court says:

"It cannot at the present day be doubted that Congress, under the power to regulate commerce among

the several states, as well as to provide for postal accommodations and military exigencies, had authority to pass these laws. The power to construct, or to authorize individuals or corporations to construct, National Highways and bridges from State to State is essential to the complete control and regulation of interstate commerce. Without authority in Congress to establish and maintain such highways and bridges it would be without authority to regulate commerce. This power in former times was exerted to a very limited extent, the Cumberland, or National, Road being the most notable instance. Its exertion was but little called for, as commerce was then mostly conducted by water, and many of our statesmen entertained doubts as to the existence of the power to establish ways of communication by land. But since, in consequence of the expansion of the country, the multiplication of its products and the invention of railroads and locomotion by steam, land transportation has so vastly increased, a sounder consideration of the subject has prevailed and led to the conclusion that Congress has plenary power over the whole subject. Of course, the authority of Congress over the territories is, and ever has been, undoubted. But the wider power was very freely exercised, and much to the general satisfaction, in the creation of the vast system of railroads connecting the east with the Pacific, traversing states as well as territories, and employing the agency of state as well as federal corporations."

In case cited in 148 U. S. 341 the Court says:

"The power which Congress possesses in respect to this taking of property (eminent domain) springs from

the grant of power to regulate commerce; and the regulation of commerce implies as much control, as far reaching power, over an artificial as over a natural highway. They are simply the means and instrumentalities by which commerce is carried on. * * * We are so much accustomed to see artificial highways, such as common roads, turnpike roads, and railroads constructed under the authority of the states, and the improvement of natural highways (rivers and harbors) carried on by the General Government, that at the first it might seem that there was some inherent difference in the power of the National Government over them; but the grant of power is the same."

A Flower-Bordered Highway.

The course of Lincoln highway is to be beautified from ocean to ocean by the planting of trees, shrubs and flowers along each side of the roadway at a cost of \$25,000,000.

The General Federation of Women's clubs has formulated plans for beautifying the highway and has already received pledges of nearly \$3,000,000.

Co-operation of governors of the various states and mayors of the various cities through which the highway passes has been promised, and local committees are being appointed in the districts.

Fruit trees will be planted along the roadside by several states.

Randolph county, Ala., will spend \$8,000 in surfacing the Roanoke and Wedowee roads with topsoil.

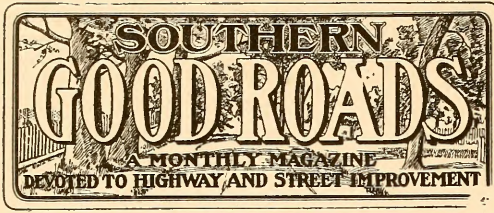


Extension of Ferguson Avenue out of Savannah, Ga. 3.1-2 miles tangent with only 11 inches grade in its entire length. Automobilists say they can make 100 miles an hour on this road. Photo by U. S. Office of Public Roads



Main Highways Radiating From Atlanta, Ga., the Touring Hub of the South. As a Route Center, it Ranks with





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Official Organ of the Virginia Road Builders' Association

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AMERICAN ROAD CONGRESS.

The American Road Congress, which will be held in Atlanta, November 9th-14th, should be the means of arousing such an enthusiasm and create such a demand for good roads in the South that road construction will be started in this section on a scale that has never before been known in America. The South was never in a better condition, financially, than she is today, to take up on a very large scale the construction of public roads. The American Road Congress, which will probably be the largest and most important road congress ever held in this country, will be the medium through which the South will be able to give expression to her needs in regard to road surfacing materials, road machinery, etc., and through which she can receive and obtain the information necessary to enable her to build the right kind of a road in the right place.

The importance of this road congress to the South cannot be over-estimated, and we fully expect to see, as a result of the week's sessions of this congress, state highway commissions inaugurated in many of the Southern states, better roads constructed in many localities where now the roads are considered good enough, and a more earnest desire on the part of road officials to give to their state, county, or township, the best road located in the right place.

As all phases of road construction, road surfacing

materials, culverts and bridges, and organization of road forces will be discussed at the Congress, it should be possible for any one in the South to obtain any information desired on any question regarding the public roads.

MAINTENANCE OF PUBLIC ROADS.

The question of maintenance, or upkeep, of the public roads is beginning to be appreciated in this country, and the importance of proper maintenance cannot be over-estimated. We are constantly having the roads of this country compared to those of European countries, only to find that ours are reported to be very inferior. It is the opinion of engineers who have examined the roads of the various European countries that our public roads, when newly completed, are in every way equal to, or better than, the European roads; but the European countries have for some time fully appreciated the importance of maintenance while we have not, the result being that our roads remain good for a few months and then begin to deteriorate very rapidly without our taking any steps to properly maintain them. On the other hand, the European countries have a systematic and efficient method of maintenance which begins as soon as the road is constructed, and they are kept constantly in good repair.

There is no question but that the neglect of maintenance increases the amount of deterioration out of all proportion to the time involved, and, therefore, constantly increases the cost of repair.

No one would expect any building, no matter how well or poorly constructed, to remain in good condition without being repaired, and it is also known that the cheaper the construction, the more expensive the proportional repair work. It is the same way with the public road. No matter how it is constructed, or with what material it may be surfaced, it constantly needs repair, and the cheapest and most efficient method is to begin the repair work just as soon as the road begins to deteriorate.

There is too much tendency to utilize all available funds for construction work, leaving the roads already constructed to shift for themselves. This is a wasteful and expensive policy, and is in many sections retarding good road construction. Provision should be made for the upkeep of a road just as soon as the road is completed, and the funds provided for this maintenance should not be allowed to be used for any other purpose.

Maintenance is, perhaps, the hardest problem that has to be solved at the present time in connection with public road work, and upon its solution depends the success or failure of the road work in many sections of this country.

BOND ISSUES FOR PUBLIC ROADS.

The enormous sums that are being raised for the construction of public roads by the issuing of bonds, many of which are long termed bonds, raise the question as to the best method of expending these large sums of money. As is well known, the only part of a public

road that can be made permanent is its location, and for this reason any money raised by a bond issue should only be spent upon such roads as are permanently located. Then, again, just as large a part as possible of the bond issue should be spent on the location of the road and only the smaller per cent spent in surfacing it. Included in the location would be the construction of culverts and bridges, and these should be put in of as nearly permanent material as possible. This is especially true where the bond issues are long termed; for at the expiration of the bonds it will be found that the results obtained by the expenditure of the greater portion of the bond issue in permanent location are as good and permanent as when the work was first done. On the other hand, the surfacing material used on the road has been changed or renewed probably several times during the forty years that the bonds have run.

There has been too much tendency in recent years to use the money raised by bond issues, especially if the bond issue is a small one and by a township, in the repair of old roads and in temporary location of new roads. This means that in a few years after the expenditure of this money the results first obtained are entirely lost, and, when the bonds become due, there is absolutely nothing to show for the expenditure of the bond money.

In all cases where bonds are to be issued by a county or township, there should be provided a means for raising not only the interest on the bonds, but, also a sufficient amount to provide for an adequate sinking fund.

As the state authorizes the issuing of such county and township road bonds, it should, in the act authorizing such issues, stipulate that such money can only be used in the construction of roads, and that such construction work must be on permanent location; and that the county or township must obligate itself to provide by a special road tax a sufficient sum to pay the interest and provide a sinking fund.

Atlanta, a Pre-Eminent Southern Route Center.

Without question the most important automobile touring center of the southern states is Atlanta, Ga., and as a glance at the map in the center page of this issue will show, important trunk lines reach out from the capital of Georgia in practically every direction. Through Atlanta passes the great trunk line from New York and Philadelphia, either through Gettysburg into the Shenandoah Valley, or through Baltimore and Washington to Greensboro and Charlotte to Montgomery, Mobile and New Orleans. As far as Atlanta, this is also the route for a considerable proportion of the through travel from the northeastern seaboard states to Florida. While much longer than the route from Charlotte through Columbia, Augusta and Savannah to Jacksonville it is preferred by a considerable proportion of the through travel. Through Atlanta also passes the predominant trunk line from the central west through Chicago, Indianapolis, Louisville, Nashville, and Chattanooga to Macon and Jacksonville. This is second in importance only to the seaboard trunk line from New York to New Orleans.

Atlanta is also on the principal route from Charlotte to Greenville and Anderson to Birmingham, Jackson and Vicksburg; and to the southeast there is a route scarcely less important through Augusta to Savannah, with a connection from Augusta and Orangeburg to Charleston.

As a route center, it ranks with New York, Chicago, Boston, Pittsburgh, and St. Louis; and the travel through Atlanta is bound to increase as routes are developed through the southeastern states, and particularly the all-Southern route from the Carolinas through Georgia to the Gulf States, Texas and Southern California.

Proper Road Construction at Low Cost and Maintenance.

Highway improvement, like the growth of population, should be progressive, argues a student of the subject. Each should be suited to the requirements of its period. This contemplates, first, the proper locating, grading and drainage of the subbase, which are essential to any good road.

This subbase can be used as an earth road during the years when traffic is light and can be kept in serviceable condition by dragging after spring and fall rains at a cost of \$30 a year a mile.

The second step is to make a gravel road, when travel increases or funds become available, by applying several inches of sharp, clean gravel after dragging and rolling the earth road. This can be done in most places for a few hundred dollars a mile, and maintenance will cost about \$100 a mile.

When the gravel road is outgrown, it forms an excellent foundation for a concrete surface. It is only necessary to loosen the gravel, and roll it to uniform compactness, then lay a course of hydraulic concrete to carry heavy traffic. The surface construction costs approximately \$1.50 a square yard. Maintenance should not average more than \$50 a mile.

The final step in progressive road building, when heavy teaming and trucking predominate, is to lay a course of vitrified brick or granite sets grouted with cement on a sand cushion on top of the concrete. Or, if part of the road should become a residence street or set apart as a boulevard, a quiet pavement of wood blocks, sheet asphalt or asphalt blocks can be laid on the concrete.

This is the most practical and economical plan, providing for varying volumes and kinds of traffic over a century or more of use and involving loss of investment in pavements that are excessively costly to maintain and which are not essential as a foundation in the final type of highway.

Governor Hays on the Roads.

The Little Rock Gazette of Sept. 17, carried this interesting note about Governor Hays, the popular chief executive of Arkansas:

Governor Hays deserted his office at the statehouse this morning to take his place on the road in observing the Good Roads Days which he set apart by proclamation two weeks ago. Road working is no new thing for the governor. Last year on Good Roads Day he led a number of Little Rock officers to the county roads and showed them what could be accomplished on Good Roads Day if everybody would work. The governor is back at his post today working on Forest Park avenue, just west of the city. The overseers in charge of the gang of which the governor is a member, are Martin Sharp, S. G. Doyle and John Kanish.

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Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

EXECUTIVE COMMITTEE

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Culpepper, Va.

B. W. Hubbard
Forest Depot, Va.

C. B. Scott
Lynchburg, Va.

Through the courtesy of the publishers of **SOUTHERN GOOD ROADS** this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary



ARTICLE III. CONSTITUTION MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

Mr. D. H. Winslow, engineer of the U. S. office of Public Roads, announced in Petersburg last month that that portion of the Petersburg and Atlanta highway between Petersburg and Nottoway river had been completed and that 20 miles of the road had been taken over by the government.

Mr. Winslow spoke in the highest terms of the cooperative spirit with which he had been met by the Dinwiddie road board.

Secretary William M. Martin of the Petersburg Chamber of Commerce will within a few days award the contract for the erection of mile posts along the route.

The signs are to measure 3 feet long by 12 inches wide and will bear the following inscription, "Petersburg ——— Miles, Quebec-Miami," thus denoting the number of miles one is from Petersburg as well as advertising the fact that the route is a national highway.

* * *

Road Work in Rappahannock County, Va.

Rappahannock county is located on the east or slope of the Blue Ridge Mountains in that section between the Norfolk & Western Railroad on the north and west and the Southern Railway on the south and east. Up to the present time no railroad has tapped this section, and on this account, the citizens of Rappahannock county have ceased to look upon good roads as a luxury, but as a dire necessity.

In April, 1910, an election was held in the Wakefield magisterial district to vote on the question of issuing \$30,000 in bonds for the purpose of building a macadam road from the Warren county line, which is the crest of the Blue Ridge, to Flint Hill, a distance of seven and one-half miles. The citizens approved this issuance, and in June, 1911, actual work was begun.

This road was graded and macadamized its full length for the money thus appropriated, and in December, 1912, the road was completed.

At the same time this work was in progress, Warren county constructed a road from the top of the Blue Ridge to Front Royal, thus giving the people of the eastern end of Rappahannock county an outlet to a railroad.

This was not sufficient, as Washington, the county seat, is six miles west of Flint Hill and a very large percentage of the county is from fifteen to twenty miles further west. In the winter of 1912 and 1913, the citizens of Hampton district asked for an election to be held to vote bonds sufficient to build a road from Flint Hill to the Piedmont district line, and at the

same time the citizens of the Piedmont district asked to vote bonds to build from the Hampton district line to the Stonewall district line.

This election was held in May, 1913, and a bond issue was approved for \$36,000 in the Hampton district and \$27,000 in the Piedmont district.

This money was appropriated with the prospect of the county getting a state convict camp, so in December last, a camp of approximately fifty men was established.

Inasmuch as the county has made no further preparation for the work, only the small tools were bought until February, when bids were asked for on a complete rock crushing and road building outfit. So at a regular meeting of the board of supervisors in March this outfit was purchased, together with fourteen mules, which were gotten in Kentucky.

Until May 1st, the entire force was used in grading the first two miles of the road, about five thousand cubic yards per month being moved.

When the question of opening a quarry was considered, it was found that the rock in this immediate vicinity was very inferior, but as there was no choice in the matter, we decided to try to overcome this in a way by adding two inches in depth to the regular depth specified by the State Highway Commission.

We began laying stone in June, and up to the present time, have built about one and one-half miles of macadam, putting approximately twenty-eight hundred cubic yards per mile, twelve feet in depth.

When specifications for the screen were given, it was thought very probable that on account of the poor quality of the stone, a surface treatment would be used, so a solution was ordered to separate the chips from one-half to three-quarters of an inch in diameter. These are being stored away for use in applying the treatment.

The most permanent road possible, for the means available, is being built. Plans for concrete bridges in every instance are being made, the longest of these being one hundred and ten feet, which will consist of three spans of equal length.

Since the road work was begun, the Stonewall district has asked that an election be held in November next for the purpose of voting as to whether or not \$26,000 in bonds shall be issued to build the road from the Piedmont district line to the Culpepper county line, thus making a connecting link of thirty miles of macadam road in Rappahannock county. This, when completed, will add materially to the much needed high-

way from the northern end of the valley of Virginia to Richmond and the South.

J. L. CRESAP,
Resident Engineer.

* * *

Free and Prison Labor For Roads.

One of the means of employing prisoners that comes nearer being satisfactory to all concerned is to use them on the construction of our public roads, as it does not interfere with any of the classes of organized labor and the benefits accrue to all, prisoners included, as most of them are physically and mentally better off when their term is out than when they started, and the effects on local crime is to diminish it.

To get a fair comparison with prison and free labor efficiency on highway construction, it is necessary to get two roads that are similar in physical characteristics, with practically the same conditions of superintendence.

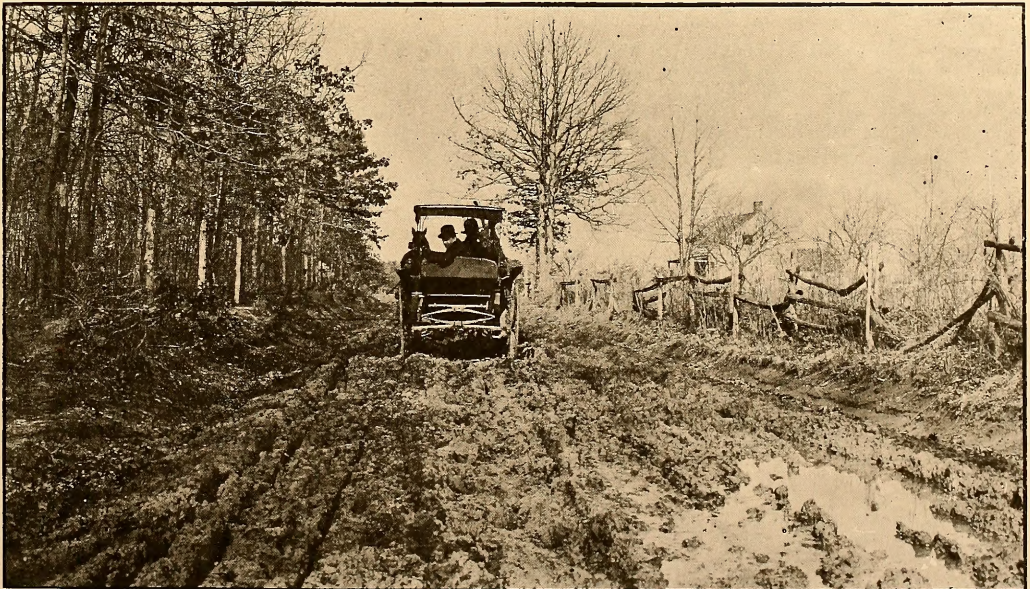
In the northern district of Virginia, where the road material varies from the gravel along the Potomac Coastal Plain to the soil roads bordering along the plain and the coarse grained igneous rocks between it and the Blue Ridge Mountains where the fine grained igneous rocks are found and across these mountains in the Shenandoah Valley, where we get limestone, it is possible to get two roads where the condition of grading, quarrying, etc., are very similar with prisoners on one and free labor on the other.

Free labor conditions in this district are at a disadvantage when compared with other sections of the state, as it is near the eastern cities where the demand for labor is great, and included in the district is one of the finest farming sections in the United States, also one of the best orchard sections, all of which make demands on a large part of the local labor during the road building season. These conditions have to be met in the greater part of this section of

the state, as it is necessary that the crops and fruit be gathered when ready, and the local people are willing to pay a price that will attract the free labor to them if the necessity arises, and disorganizing the road forces that have been organized earlier in the season is of small importance to them in comparison to saving the crops.

In the larger counties where state aid is sufficient to carry on the work continuously, from early spring until late in the fall, and having several different jobs going all the time, it is possible to get an organization that is more or less permanent after several years' work, but in the smaller counties, where we only have a mile or so of road to build each year, and each year the work is in a different district, the labor problem is acute, and the cost for similar work is often increased from ten to thirty per cent by local demand for labor, as there are certain overhead charges that are continuous during the construction, and when the local demand takes labor from the road it is not possible to place the remaining force on just a mile or two of road to as good advantage as we can on the larger jobs, as we usually finish the grading and then put on the wearing surface, and when the force is small, it is hard to place them to the same advantage as can be done on larger jobs where all parts of the work are continuous, and when we are short-handed, cut out a part of the work.

The convict labor is used to the best advantage on the roads where the grading is heavy and quarrying necessary, as it is then possible to concentrate the force so that foremen and guards can give closer attention to individual efforts, as the prisoners realize that this is their punishment and the less work they do, the less the punishment, and there are always a lot of imaginary adjustments to clothes and tools that kill time for a few minutes, and at the end of the month it amounts to several hundred hours for a road force.



Floundering Through Mud in Spottsylvania county, Virginia.



Note the Transformation. This is the same road in Spottsylvania county, Virginia. Photographed by the United States Office of Public Roads.

There is always a lot of light work that can be done on free labor jobs by one or two men, but with prisoners it is necessary to take a gang of at least eight men to do the same work and not get them scattered out of the guard zone, so that this class of work takes about twice the number of convict hours that it does with free labor.

In winter when most free labor jobs are closed down on account of the frost and bad weather, the prisoners are worked every day except Sundays and holidays, and the weather permits, and I think that it is the work done during this season and included in the year's total work that brings down the efficiency compared with free labor more than anything else. On the gravel and soil roads this is not as great loss as on the macadam roads, as this class of work can be done to better advantage in winter than macadam, but it varies greatly, depending on the severity of the weather and local conditions.

A considerable reduction in the cost of convict-built roads is due to the fact that teams are owned by the counties or districts and their maintenance only is charged to the cost of the road, and it only amounts to about thirty per cent of team cost on free labor jobs, as teams are hired from local farmers by the day. On both kinds of work the mechanical outfits are owned by the counties or districts; with free labor jobs they are allowed rent for the outfits as part of their half of the cost of the work and it adds about ten per cent to the shown cost of work, and with convicts, the maintenance is only charged to the cost of the work.

It is not practical to use prison labor on the state-aid work in the small counties, as only a mileage is built each year that would not permit a camp to do its maximum amount of work from one location. In fact, there is not enough work to keep a camp employed for over six months, and in these counties where

this form of labor is used, the work is done from the proceeds of bond issues and some definite system of roads to be improved.

The small jobs are usually done more economically by force account than by contract, as a contractor would have to move in an outfit from a distance and moving charges would have to be distributed over such a short piece of road as to make it prohibitive in most cases; and as these jobs have to be advertised, as required by our road laws, we seldom get bids on the short jobs; and when we do receive bids they are usually so high that it is possible to save from 10 to 30 per cent by throwing out the bids and doing the work by force account.

Another reason for doing the small jobs by force account is that we are able to get just as satisfactory construction with less than half the costs for engineering and inspection. This is also true for small bridges, but this year competition in concrete work is so great that we are letting bridge work to much lower bids than formerly.

R. F. EASTHAM,
Resident Engineer.

Radford and Pulaski, two Virginia towns that lie opposite each other on New River, are planning to erect a bridge across the river to cost \$25,000, the cost to be borne equally by the two towns.

It is worth noting that in Warren, Ark., on good roads days, Sept. 17 and 18, every business house in town sent two able-bodied hands to work the roads around Warren. A pike road was constructed toward Pine Bluff to a point on the Saline river where a steel bridge is to be built soon.

On November 3rd, Spencer county, Ky., will vote on a bond issue of \$30,000 for bridges and culverts.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

The Alabama Farmers' Union held its annual convention last month at Birmingham, and there were delegates present from every county in the state. Following the election of officers and the completion of other business the Union adopted a strong set of resolutions, among which are the following of interest to the good roads advocates of Alabama and the South:

We, your committee on good roads and legislation, have jointly considered the subject of legislation for good roads in Alabama. We beg to report the following recommendations.

Resolved, first, that we urge the next legislature of Alabama to pass an act that all road moneys that are raised by the present tax law be placed upon the highways of the state, believing that the intent and purpose of the taxpayers is that the money shall go upon the roads.

Resolved, second, that we favor the continuation of the present state aid appropriation with the same provisions, so that each and every county in the state shall receive equal amount of funds for building state aid roads.

Resolved, third, that we favor the employing of competent highway engineers in building roads in the state.

Resolved, fourth, that we heartily endorse the Alabama Good Roads Association in its splendid work in pushing the question of good roads in Alabama, and that we further congratulate it over promoting Good Roads Days, August 14, 15, 16, and that we join in the same in asking the next legislature to declare said days permanent for the working of public highways of this state.

Resolved, fifth, that we favor the working of the state and county convicts on the public roads of Alabama and urge the next legislature to pass such legislation as will make it possible for the same to be done.

Resolved, sixth, that we look with favor upon the movement to amend the constitution of Alabama, so as to issue state bonds for the purpose of building roads also for the purpose of taking advantage of the national aid appropriation, which is surely to come.

Resolved, seventh, that we accept the invitation to attend the eighteenth annual session of the Alabama Good Roads Association, which meets in Montgomery on October 21-23, and that the presidents of the various county unions be requested to appoint ten delegates from their respective counties, and that the president of the state union be authorized to appoint fifty delegates from the state body to attend said meeting.

Resolved, eighth, that the legislative committee of the Farmers' Union are hereby authorized to present our demands and requests to the next legislature of Alabama for passage, and ask that the same be passed.

Resolved, ninth, that we ask the co-operation of good roads associations, automobile associations, civic and labor bodies to join us in seeing that the recommendations we hereby make are carried out by the next legislature of Alabama.

* * *

Arkansas.

It is announced that a petition, signed by many citizens of Boone county, Arkansas, asking for the formation of an improvement district to build a macadam

highway between Harrison and Jasper has been filed with County Judge Alexander and forwarded by him to the state highway commission at Little Rock. The Newton county petition has already been sent to the commission and it is expected that the latter body will soon take action on the road plan.

It is expected that as soon as possible Highway Engineer Carter and his assistants will go to Boone to make a survey of the proposed road. This will probably be within a comparatively short time as the engineers endeavor to respond quickly to the calls made upon them.

After the survey has been made and the cost of the proposed improvement determined, the signatures of a majority in value of the real property owners in the district must be obtained to a second petition. When this is done the district is finally organized and the highway commission will proceed to sell bonds to raise the necessary money.

So much interest has been aroused in this proposed road and the sentiment seems to be so strong in favor of it that it is believed the project will be carried through in record time.

* * *

Georgia.

The Savannah Morning News prints the following:

Nothing of more vital import confronts Savannah today than the problem of connecting Chatham with the outlying territory through the establishment of a system of trunk roads.

That this fact is true and is recognized was demonstrated recently when a monster rally of good road enthusiasts from Chatham, Screven and Effingham Counties was held in Springfield and plans laid for establishing the Savannah-Augusta highway.

This proposed highway will do more than open automobile communication between Augusta and Savannah. It will put Savannah in close touch with a vast territory which is now practically isolated. The establishment of this highway will create interest in the subject of inter-county roads in the several counties between Savannah and Augusta and will spur them on until they build roads connecting the adjoining counties in every direction.

At the Springfield rally the Savannah-Augusta Highway movement was auspiciously launched. The main obstacle to the establishment of that highway is the road through Effingham county. The citizens of Screven county volunteered at that time to send men and equipment to Effingham to assist that county in putting the road through the county in first class condition. The commissioners of Chatham agreed to assist in the work as soon as certain difficulties were surmounted.

All of the other counties between Savannah and Augusta have roads that are suitable for automobile travel. Improvements are to be made where needed and the highway seems assured, though just when it will be realized is problematical.

With the establishment of the Savannah-Augusta highway this city will be connected with the city of Quebec by means of a first-class motor road. That part of the Quebec-Miami highway between Quebec

and Augusta is now being constructed and the establishment of the highway between Savannah and Augusta will mean one more big link in the chain. To be on the route of this Quebec-Miami highway is quite an ambition and it is hoped that Savannah will achieve it.

Frank C. Battey, chairman of the good road committee of the Savannah Automobile club and father of Savannah's best efforts, says: "I hope that we can get a system of inter-county roads built and the plan to get a highway between Savannah and Augusta is a move in the right direction."

Arthur W. Solomon, secretary of the Savannah Automobile club and county commissioners, is enthusiastic over the project. "Savannah has an opportunity to get on the highway which promises to be the most generally traveled between the North and Florida," he declared.

Another ambitious undertaking in the interest of good roads was started during the past year by the Savannah Automobile club and The Morning News. A successful run was conducted between Savannah and Augusta. It resulted in working up a great deal of interest in a plan to establish what is to be known as the "Dixie Overland Coast to Coast Highway." The plan is to have a run conducted from Columbus to Montgomery, from Montgomery to a city farther west and so on until the coast is reached.

Kentucky.

Counties of Kentucky, and counties of few states, for that matter, are availing themselves of all the benefits of the state laws recently passed by a number of commonwealths, declared Robert C. Terrell, secretary of the Kentucky Goods Roads Association, in an address in Louisville before the Kentucky Association of County Judges.

Mr. Terrell pointed to the good road laws passed by the last Kentucky General Assembly, which provide that the commonwealth shall bear one-half the burden in all cases where counties undertake road improvements. He again pointed out that of the 119 counties in the state, a mere handful had yet made application to the state department for benefits accruing under this law.

The new Kentucky law provides that if a county shall undertake road construction, that the state, where due application is made by the county, shall bear half the expense, paying to the county two per cent of its donation each year until the entire sum is paid.

Poor selection of engineers is another cause of Kentucky's poor road work, declared several county judges present, others of whom pointed to the fact that many of the counties of the state had no engineer at all. This fact speakers deplored and means of remedying the lack of road work in the state were discussed with interest.

As a result of the "get-together" meeting held at the state fair grounds, in connection with the state association, it is believed that highway work in Kentucky has received a great impetus and that it will be prosecuted more vigorously than ever during the coming year.

Missouri.

Some time ago Secretary John T. Stinson of the Missouri State Fair Board, conceived the idea of marking the roads centering at Sedalia as "State Fair Roads," and as Pettis county is honeycombed with rock roads, eight of them connecting with "main"

roads into other counties, his idea received at once the indorsement of good roads advocates throughout the state.

Volunteers were plentiful. Automobile enthusiasts took the matter up. Meetings were held. The Sedalia Boosters' club got behind and boosted, with the result that a week before the opening of the fourteenth Missouri State Fair, there was not a road intersection within fifty miles of Sedalia in any direction that was not marked. A telegraph pole or a telephone pole or a blazed tree bears the white band, red stripe and pointing arrow that shows the way to the State Fair city. And east and west, north and south, along the designated state highways, these markers are plentiful and so conspicuous that the night driver may see them as well as the daylight wayfarer.

Oklahoma.

Col. Sidney Suggs, state highway commissioner of Oklahoma, is one of the most progressive and aggressive good roads men in the south. He is to occupy a prominent place on the program of the American Road Congress in Atlanta next month and in making mention of this item of news the Ardmore Democrat paid the Colonel a high compliment. The Democrat said:

The work which State Highway Commissioner Sidney Suggs has done in this state fits him admirably to occupy a prominent place on the program of the Fourth American Road Congress, which convenes November 9 in Atlanta, Ga., for a six-day session. The topic assigned him for discussion is: "Educational Field for Highway Departments." Mr. Suggs is fitted for this work for the reason that he has been forced to fight every inch of his way in this state. When he began, the state and the individual counties of the state were opposed to him. Hired men have been sent into every county to utter expressions that would prejudice county boards and township boards against the department, the department did not have the prestige of a suitable law to work under, and fighting against such odds has required a great deal of persistence and faith in the final triumph of right.

At this time three-fourths of the counties are in line with the department; county boards are repudiating claims against their counties for bridge material that has proven faulty and where work has not been done according to specifications. The trend of improvements has turned from the cheap to the enduring. Every county has been gone into by the highway commissioner and one by one, men have come to his standard. This great campaign fits Mr. Suggs to be of genuine service to men in other states, many of whom must go through the same trials if they win.

Texas.

The Houston Post has another good roads car in operation over the highways of Texas. This progressive paper has done a great deal of good by means of its good roads tours and it is encouraging to note that the work is to be kept up. The first trip of what may be called the "new series" of the Houston Post Good Roads Car, was made Tuesday, Sept. 8, through the territory near Wharton and through Fort Bend County. The excursion was successful and at each town large groups of citizens greeted the visitors. Mass meetings were held in Wharton, Wallis, Rosenberg and Richmond, and in each place the people welcomed the good roads fight with much interest.

Probably the most striking feature of the trip was the organization of a permanent list of committees

who will take up the good roads fight in the various sections and will work in conjunction with The Post party in its fight for better highways through the section.

The committees for the various towns are as follows: Wharton—John Dennis, J. F. Bagwell, H. J. Bolton, H. J. Russell and H. A. Kline.

Wallis—R. W. Guyler, Ben Stern and W. L. Thomas. Rosenberg—L. W. Cummings, H. O. Schmultz, W. J. Meininger, G. R. Hallman, Tom Coleman and H. A. Meyer.

Richmond—T. B. Wessendorf, J. W. E. Stephens, J. H. P. Davis, D. R. Pearson, W. I. McFarlane.

These bodies will work toward the goal of an organization for better roads through this section. All of the men named are enthusiasts over better highways and they have taken a prominent fight in each community toward the building of permanent roads.

Leaving Houston at 4:15 o'clock, The Houston Post Good Roads car ran immediately to Wharton. The car carried E. G. Pike, division commercial manager of the Southwestern Telegraph and Telephone Company; W. J. Curry, secretary of the Houston Motor club; F. E. Wilson, of the Overland-Houston Company; W. J. Meininger and C. U. McDowell, of the automobile department of The Houston Post.

American Road Builders' Association Meets Dec. 14-18.

The Program Committee of the American Road Builders' Association reports that plans for the Eleventh Annual Convention to be held as the American Good Roads Congress in the International Amphitheatre, Chicago, December 14-18, are nearing completion. The general features of the program have been decided upon, practically all of the subjects have been chosen and the assignment of speakers is now being made.

While the tentative plans have been for a convention commencing on Monday, December 14, and ending on Thursday, December 17, the whole affair has assumed such proportions that it has seemed necessary to devote Monday afternoon and evening to registration and the exhibition and to begin the sessions on Tuesday, thus necessitating the addition of one day to the convention. The meeting will, therefore, cover the dates December 14 to 18, inclusive. Registration will be carried on throughout Monday afternoon and evening, and the Sixth Good Roads Show will be formally opened at 7:30 p. m.

The forenoon of Tuesday, September 15, will be devoted to the reception of delegates and visitors and to committee meetings, other preliminary business and the inspection of exhibits. At 2:30 p. m. the Congress will be formally called to order by President W. A. McLean and addresses of welcome will be given by officials of the city of Chicago, the state of Illinois, the Illinois Highway Commission, the University of Illinois, the Illinois Society of Civil Engineers and Surveyors and the Illinois Highway Improvement Association.

The technical sessions will commence on Wednesday and will be held each morning and afternoon until the close of the convention. On Wednesday evening, the Association will hold its annual dinner.

Essentially the same plan for the program as that adopted at recent conventions of the Association will be followed. The various subjects to be treated have been so chosen as to cover the important phases of the three general divisions of the subject of highway work: Organization, Construction and Maintenance. Each topic will be introduced by a short paper presented by an authority especially selected for his knowl-

edge of the subject on which he will speak. The discussion on that topic will then be opened by an especially selected speaker, who will be followed by other speakers, also selected because of their familiarity with the subject. The discussion will then be open for anyone who chooses to take part.

Among the topics to be treated are the following: "Road and Pavement Dimensions—Widths, Depths and Crown;" "Road Foundations—Concrete, Telford, Gravel, etc.;" "Organization;" "Traffic—Present Tendencies, Probable Development and Regulation;" "Machinery for Construction and Maintenance;" "Brick Roads and Streets;" "Surface or Floors for Bridges;" "Bituminous Construction and Maintenance—Recent Practice;" "Concrete Roads;" "Recent Practice in the Construction of Wood and Granite Block Pavements;" "Earth and Travel Road Construction;" "Street Paving in Small Cities;" "Convict Labor in Road Construction," and "Dust Prevention and Street Cleaning."

On Thursday evening it has been suggested that a popular session be held similar in character to the one in Philadelphia last December. The program for this meeting has not been fully determined, but it is expected that speakers of national prominence will take part. The local committees in Chicago are co-operating with the officials of the Association and ample arrangements for the comfort and convenience of delegates are assured.

Application for exhibition space continue to be received and there is every indication that this feature, which has come to be known as the Good Road Show, will this year far excel in extent and importance the exhibition of last year.

Alabama Good Roads Association Montgomery Oct. 21-23.

The executive officers of the Alabama Good Roads Association are making every effort possible to make the eighteenth annual session, which meets in Montgomery October 21 to 23, a great success. Letters to probate judges, mayors, presidents of commercial clubs, good roads and highway associations, and other civic organizations have been mailed, requesting each of them to appoint twenty-five delegates each to attend the convention. The following is a copy of the letter that has been sent from headquarters of Secretary J. A. Rountree:

"The Alabama Good Roads Association will hold its eighteenth annual session in the auditorium of the Exchange hotel, Montgomery, October 21-23.

"President May, of the Montgomery Chamber of Commerce, Hon. William A. Gunter, mayor of the city of Montgomery, and Hon. Emmet O'Neal, governor of Alabama, join the association in an effort to make the coming meeting the greatest convention the association has ever held. They officially extend a cordial invitation to you and the delegates that you appoint to attend this meeting.

"We are instructed by the executive committee of the association to extend a hearty invitation to you to attend this convention as a delegate and to appoint twenty-five delegates to represent your county at the convention.

"We feel assured that you will select men interested in good roads and who are able to attend. We want to ask you that you notify them of their appointment and urge them to attend. We will also notify them as soon as we receive their names and addresses from you.

"The association, for the past eighteen years, has

done a great deal of work in encouraging the construction and maintenance of improved roads in Alabama. of location, construction and maintenance of roads, cause through speakers, press and literature, and doing everything it can to take Alabama out of the mud and put her at the head of the alphabet in building and maintaining good roads.

"The convention will be educational as well as entertaining. Some of the best equipped men in the country will address the convention on the questions of location, construction and maintenance of roads, federal and state aid, and the progress of the road movement will be reported from all sections of Alabama. This convention will be the most important meeting that has ever been held in the past eighteen years, from the fact that recommendations will be made to the Alabama legislature for state aid, amending the good roads laws of the state, and such legislation as necessary to advance the cause of good roads in Alabama.

"We fully realize that the county, without good roads, is a dead one, and we want to help make every community in the state a live one. Will you not come and bring a good delegation from your county? Literature and program giving further information will be sent.

"Please send list of delegates to Mr. J. A. Rountree, secretary of the Alabama Good Roads Association, P. O. Box 886, Birmingham, Ala."

Kentucky Association of County Judges

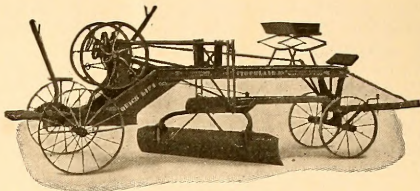
In Louisville, on September 17, there was a meeting of the Kentucky Association of County Judges, which was attended by about 20 judges from various sections of the state. A great deal of time was devoted to the considerations of road problems and State Highway Commissioner R. C. Terrell, delivered a very interesting and instructive address on the state aid law recently passed by the Kentucky General Assembly.

Commissioner Terrell said it was imperative that the efforts of his department receive the earnest support of the County Judges if results were to be obtained, and that with good roads abounding in the various counties the judges responsible would leave a monument to their memory that would live for all time. He said incompetency displayed by many men heretofore in charge of road building, as shown in examinations of applicants for positions as road engineers, was astonishing. In many instances, he said, these men had been in charge of the work in their respective counties for years because of a political pull or because of friendship of the appointing power, and counties had paid out thousands of dollars without receiving any good results.

Under the new road law Kentucky will raise next year approximately \$600,000, Commissioner Terrell said and of this amount Jefferson county will contribute \$120,000. Of the amount thus to be contributed by Jefferson county, he said, the county will get back into its road fund \$12,000, while the remainder, \$108,000, will be contributed to other counties. Forty of the counties, he said, will contribute only from \$2,000 to \$5,000 for state aid, and as a result they will have to draw from the fund contributed by other counties. According to statistics furnished by Commissioner Terrell only five counties will contribute more than they will receive from the fund. Since the measure became a law four counties have applied for state aid. They are: Boyle, Madison, Lawrence and Johnson counties.

The Louisville Courier-Journal notes that a great deal of enthusiasm was displayed by the judges over

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the good roads movement, and a midwinter meeting will be held in Louisville December 17 and 18, when all of the County Judges, or a large majority, can attend and hear a further discussion by Commissioner Terrell. All of those present displayed keen interest in the commissioner's address, and many of them discussed the law and road work in general.

Those present were: Samuel W. Greene, Jefferson county, chairman; Samuel E. Dehaven, Oldham, secretary; W. H. Hooks, Trigg; E. C. Duff, Jr., Perry; W. V. Gregory, Graves; D. L. Currey, Mercer; J. S. O'Dell, Anderson; Wallace Brown, Nelson; J. B. Wilson, Ohio; W. M. Berry, Union; J. J. Rice, Muhlenberg; Albert Snider, Spencer; C. W. Fulton, Fleming; J. S. Yankey, Washington; G. M. Bohanan, Barren; Samuel W. Morgan, Meade; W. T. Simmons, Grant; R. F. Jasper, Pulaski, and J. E. Boltz, Campbell.

Fort Worth-Roswell Highway Association.

It is announced from Fort Worth, Tex., that about 100 good roads enthusiasts, representing Lubbock, Crosby, Dickens, Kent, Stonewall, Jones and Tarrant counties met at Spur recently and organized the Fort Worth-Roswell Highway association for the promotion of a good road to run from Fort Worth to Roswell, N. M. Clifford B. Jones was elected president of the new association, Jeff D. Reagan, secretary and Julian Bassett was elected vice president. Tarrant county was represented by W. H. Beck, assistant secretary of the Fort Worth Chamber of Commerce.

"There was a great deal of enthusiasm at this meeting and representative men from each of the counties pledged themselves to work for the construction of the road through their respective counties, said Mr. Beck.

"There are several through highway movements on foot in West Texas, but this is the most promising project on account of the ease with which improvements may be effected and on account of the interest and the ability of the men behind it.

"We have received word here indicating that the people of Lynn and Garza counties may join the Fort Worth-Roswell highway where it crosses Kent county. They will build a road through Clairmont, Post City, Tahoka and possibly on to Brownfield and Plains and into Roswell. No organization has been effected in those counties, however."

GOOD ROADS NOTES IN BRIEF

Precinct No. 1 of Panola county, Texas, has voted \$225,000 of bonds for road construction.

The city of Charlottesville, Va., has issued \$11,500 of bonds for street improvements.

Saratoga, Batson and Dearborn districts of Hardin county, Texas, have issued bonds for \$125,000 for road building.

Plant City, Fla., has voted bonds for \$20,000 for street improvement.

West Baton Rouge Parish, La., has voted \$75,000 of bonds for road building.

Wauchula district, De Soto county, Fla., votes this month on a bond issue of \$21,000 for road construction.

Road district No. 5, of Rankin county, Miss., is to vote on a bond issue of \$50,000 for roads.

Freeman's Creek district of Lewis county, W. Va., votes this month on a bond issue of \$100,000 for road building.

Cape Girardeau, Mo., has let contracts for street paving amounting to \$13,100.

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Dickenson county, Va., has let contracts for three miles of roads.

Galveston county, Tex., has contracted for 12,880 yards of improved road.

Hazard, Ky., will spent \$15,000 on macadam streets.

Chambers county, Ala., will grade 10 miles of road at a cost of \$10,540.

Linneus, Mo., has let contracts for 12,000 square yards of vitrified brick paving.

Lincoln county, N. C., has contracted for the grading of seven miles of road.

Pine Bluff, Ark., will surface Olive street with gravel at an estimated cost of \$4,000.

Spartanburg, S. C., has let contracts for 4,500 square feet of sidewalks and 8,500 feet of gutter.

San Antonio, Tex., has contracted for street paving to cost \$12,551.

Baltimore, Md., is asking for bids on 3,400 square yards of paving.

Dale county, Ark., will spend \$6,000 in grading and surfacing with sand clay a model section of road.

Cumberland county, N. C., is asking for bids on about 4 miles of sand clay road.

District No. 1 of Attala county, Miss., has been asking for bids on the construction of 40 miles of roads.

Lynchburg, Va., has appropriated \$2,800 to improve portions of several streets.

Nashville, Tenn., has set aside \$5,000 to be used in improving and beautifying roads on Reservoir hill.

Petersburg, Va., will spend \$80,000 in street improvement.

Bell county, Texas, has been asking for bids on 24 miles of gravel roads.

Waco, Tex., will lay 4,000 square yards of first class pavement, either of vitrified brick or sheet asphalt.

Knoxville, Tenn., has issued bonds for \$25,000 to be used in street improvement.

Rockwell county, Tex., will issue \$20,000 of bonds for road building.

Oktibbeha county, Miss., has voted \$130,000 of bonds for street improvement.

West Palm Beach, Fla., has voted \$100,000 of bonds for surfacing streets.

Ludlow, Ky., votes in November on a bond issue for street improvement.

St. Clair county, Mo., votes this month on a bond issue for roads.

St. Lucie county, Fla., has awarded contract for resurfacing and widening 5 miles of road at a cost of \$11,000.

Louisville, Ky., has awarded contracts for paving amounting to \$43,200.

Richmond, Va., will lay about 100,000 square yards of asphaltic concrete paving to cost about \$150,000.

Palm Beach county, Fla., has contracted for 25 miles of fine roads.

Richmond, Va., has let contracts for paving amounting to \$38,000.

Letcher county, Ky., will grade six miles of road at a cost of about \$15,000.

Birmingham, Ala., let a contract last month for paving and grading amounting to about \$5,000.

Charlestown, W. Va., has been asking for bids on paving 29 streets.

Calhoun county, Miss., will spend \$8,000 in the construction of 6½ miles of road.

The road trustees of Lexington township, Davidson county, N. C., have completed work on the Salisbury road and have transferred their convict force to the Mocksville road. The Salisbury road is surfaced with top soil and is a very fine road.

Jefferson county, Ala., will tear down the old steel bridge at Jasper Ford and re-build near Maxine.

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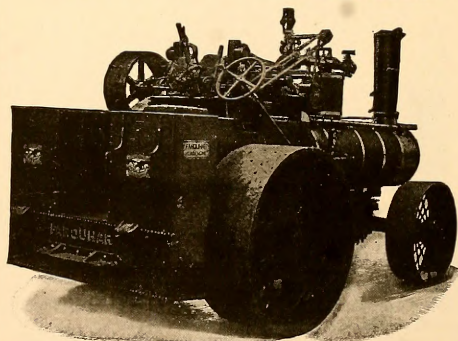
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The District of Columbia will build a bridge across Anacostia river, at Pennsylvania avenue, to cost \$10,000.

Whitfield county, Ga., will build a bridge across Mill Creek, near Dalton.

Bibb county, Georgia, votes November 3rd, on a bond issue of \$150,000 for the construction of bridges.

Iberville Parish, Louisiana, will build a draw-bridge across Bayou Grosse Tete.

The Maryland State Roads Commission recently let three additional contracts for grading, filling, excavating, etc., in connection with the construction of the Hanover street bridge in Baltimore, the contracts now let aggregating more than \$800,000.

The State Roads Commission of Maryland has contracted for a bridge across the Patapsco river, on the Frederick road, to cost \$15,500.

Calhoun county, Miss., will contract this month for the construction of a number of bridges in various parts of the county.

The county commissioners of Cumberland county, N. C., will spend \$25,000 to \$30,000 on concrete bridges throughout the county.

Washington and Nowata counties, Oklahoma, will build a county-line bridge across Curl creek.

Memphis, Tenn., has contracted for the construction of a concrete arch culvert at North Third street and Gayoso bayou, to cost \$8,700.

The commissioners of Mason county, Tex., have contracted for a 330-foot bridge to cost \$9,000.

Road district No. 2 of Trinity county, Texas, will construct a number of steel bridges. Bids are being called for.

Clark county, Ark., will bridge Caddo river near Amity at a cost of \$11,970.

Jacksonville, Fla., will construct a bridge across Hogan's Creek on Main street.

Lee county, Miss., will build 14 new bridges.

The commissioners of Stokes county, N. C., have conducted for a bridge across Buffalo creek on the Walnut Cove-Germanton road, to cost \$5423.

Garfield county, Okla., has contracted for three steel bridges.

The commissioners of Bee county, Tex., have let contracts for three bridges aggregating \$13,898.

Leon county, Tex., will construct a system of bridges, culverts and roads in Oakwood district.

It is announced from Cameron, Tex., that road district No. 2 will spend \$20,000 in the construction of 36 bridges.

Denison, Tex., has rejected bids for the construction of a 6-foot walkway bridge, estimated cost \$12,-

500, and is contemplating the construction of a viaduct to accommodate vehicles, as well as pedestrians, at a cost of about \$45,000.

Gillespie county, Texas, will spend about \$3,000 to build a low-water bridge. It will be 280 feet long and 20 feet wide.

The commissioners of Hillsborough county, Fla., cancelled contract with M. R. Raines for 29 concrete bridges after about one-twelfth of the work had been done.

Maverick county, Texas will spend \$25,000 in the purchase of old private bridges and the building of new ones.

Corpus Christi, Texas, will construct a causeway across Nueces bay, connecting Nueces and San Patricio counties, at a cost of \$140,360.

The city of Petersburg, Va., has contracted with the Virginia Bridge & Iron Co., for a bridge across the Appomattox river to cost \$5,000.

Letcher county, Kentucky, has contracted for three bridges to cost \$11,900.

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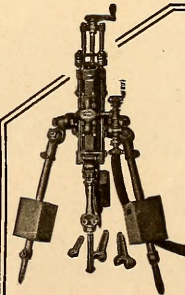
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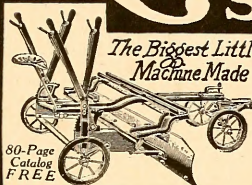
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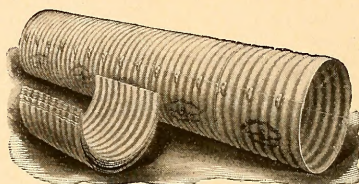
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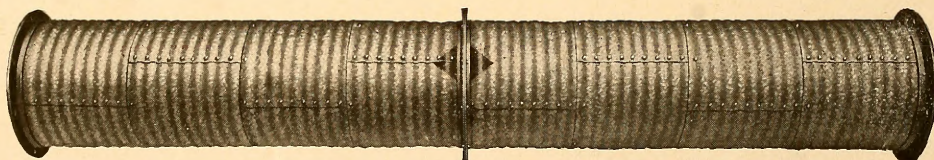
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SOUTHERN GOOD ROADS

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second class matter

The 365-Day Road Club---How It Was Organized and How It Works

By MR. E. BLAIR WALL, Carthage, Mo.

THE "Good Roads" cry is generally heard in the land, yet few realize that the condition demanded is, in the very nature of things, comparative. There is no absolute standard. And precisely as one man's meat is another's poison, so the "good" road of the man in the rainy-season section is a nice firm "corduroy," while to the one whose measure is the smooth, well-made, perfectly maintained pavements of city—street it is only an intolerable succession of bumps. It is equally true, too, that the worst road may contain in itself the elements of a much better, if not quite the

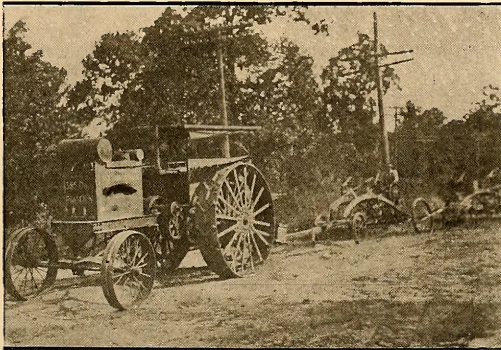
a human being. The other two attendants at that meeting, as its seed sprouted, assumed the task of providing systematic financial backing for the venture.

The fundamental need was more money than the road district's proportion of the state fund. That proportion, however, could be increased. Whatever amount was raised locally for expenditure on public roads the state was pledged to double. The point of beginning at least was evident. It was promptly agreed among the organizers that no officer of the club should receive any compensation for his services.

As a start, it was determined that one hundred men should be interested to the extent of pledging \$5 a month for a period of one year. One hundred men—or none. As Mr. Clarkson summed it up: "Any project outside of politics or religion that could get the endorsement—the cold cash endorsement—of one hundred men of the community had to be a pretty good thing! A mighty good thing!" The obtaining of the one hundred pledges is in itself a tale of the whole gamut of human nature; for good as "good roads" undoubtedly are, there were men who signed their names to that list solely to prove themselves good fellows. They neither indorsed the project nor in the least expected to be held to the obligation. That one-hundred-or-none limit, as they saw it, was their safe-guard far more than it was this visionary club's.

The committee-of-three admitted the joke might be on them—and worked on. The last twenty subscriptions hung in the balance a troublously long time, too, and the pleas for the good work went far outside the county limit. The president of a trans-continental railway system who had once been a Carthaginian sent his pledge promptly, as did state officials, sent out from our citizenship. Manufacturing firms whose products were the standbys of the mining operations were appealed to with like effect. Railroad companies whose lines pass through the county responded—railroad companies are enthusiastic believers in good roads, anyway. Finally the number was made up.

Oddly enough, then developed another psychological quality of humans in the mass: When the danger point was passed, when the plan was quite safe, the subscription jumped promptly to one hundred and twenty five. It is hardly necessary to add of course that the club had not been organized on a basis of one hundred, and no more. The second year the membership reached one hundred and forty and has remained at practically that point.

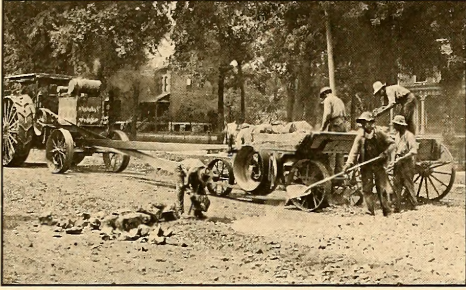


"A." Graders Bringing Street to Sub-Grade

best, road, if properly used. The clever backwoodsman, we might add, splits his corduroy and uses the plane surface instead of the convex one for his road.

In Jasper county, on the Southwest border of Missouri, there are now enough graded and graveled roads to reach half way from Chicago to New York. The impetus for a "good roads" organization came through the accident of three men of Carthage, the county seat, finding themselves and each other at a "Good Roads Convention" held in the City of St. Louis, a number of years ago. One of these, Mr. J. D. Clarkson, eventually became the Superintendent of Construction of the 365-Day Road Club, an organization whose ambition is to build roads that are good precisely that many days out of every year and quadrennially for yet another one. The name was designed also as a pledge to that end, every time it falls under the eye or on the ear of

One feature of membership proved valuable at the time as an argument and in the long run has been a potent factor in keeping those who joined. A condition of membership was that no contributions to outside road improvement should be made until such improvement received the endorsement of the club officially. This proved to be an invaluable protection. Merchants and business men of every kind are assessed by their patrons as a matter of course—though it is not always so termed. This is a big item, in the course of



"B." Portable Crusher at Work under the direction of the 365-Day Road Club. The rock is hauled to the crusher on the road and the crusher is moved forward after each 15 feet of road is covered, thus saving one haul.

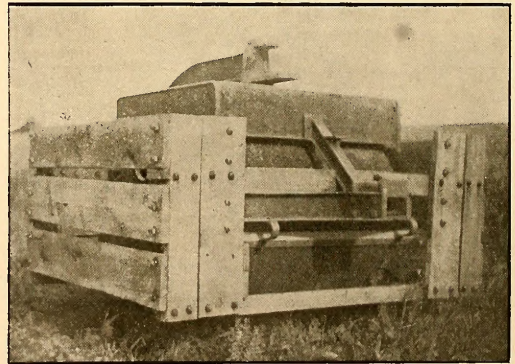
a year, in every business—this levy by more or less irresponsible parties in behalf of ventures that are necessary perhaps, certainly unorganized, yet cannot be ignored by the merchant. This section of his membership did more than protect him, too. It was an unanswerable argument; it brought the club into immediate prominence as a source of advice. And in many instances it was able to take over or to give expert assistance in the very matter the farmers were striving to accomplish. The merchant stood even better with his patron than if he had given the subscription as first asked.

A sum of money assured, the next step was a survey of the situation. Jasper county, Missouri, is on the outposts of the Ozarks, which means many stretches of rocky road; in places not unlike cobble stones, so washed and worn by travel and winds and rains is the surface. They were roads with the finest natural base in the world yet in most cases most certainly "wrongly arranged."

Mr. Clarkson began work with the King Drag and every step was analyzed. Experience soon revealed that the King Drag, excellent as it is, fell short of his need. In large depressions the entire drag dropped in; the hole was simply accentuated. Something was needed that would hold the level of the road regardless of depressions, though in using horses the limit of weight was about reached. The King Drag is three feet by eight, the "dragging" face being the shorter length. Mr. Clarkson reversed this, making the eight-foot dimension of steel, and the club invested in two thirty-horse-power gasoline engines—within a year a forty h. p. engine was added to the equipment. This was an improvement but it still fell short. Another four feet was added, and yet another, making the final one sixteen feet in length. This covered any possible depression, filling in dirt as needed and leveling the surface, but Mr. Clarkson's ideal of efficiency was not attained. His next step was to double the drag, as the illustration shows, doing twice the work with one trip over the ground.

Minor difficulties presented themselves. Difficulties usual perhaps in the use of a drag yet not desirable in the construction of the perfect road. The steel face or blade of the drag tore open what may be called the pores of the road bed—and a chance watching of a stone mason at work gave Mr. Clarkson the key to prevention of that. The mason on his smaller scale tore open just such pores in his medium; but he went back with his trowel and deftly smoothed the surface. To trowel-smooth a road-bed after each trip of the drag was something of an undertaking; the roller would accomplish it, but the road was not ready yet for the roller. Mr. Clarkson decided that prevention was infinitely better than remedy, so he added a smooth four-inch oak timber as a backing to the steel face of the drag and flush with its working edge. This, as will be readily seen, acting so immediately after the drag, served to stop the tearing open of the pores and at the same time brought the pressure of the whole machine to the "troweling" of the surface.

But necessity and its offspring, invention, were not yet exhausted. Road drags were given to depositing in the center of the road a loose heap of material—necessary for a perfect crown yet in a condition decidedly objectionable to the traveler on the road; so objectionable in fact that he with one accord took to the ditch until the crown was less strenuous travel. Mr. Clarkson's efforts to overcome this evil resulted in what may be called the gem of his road-making inventions—"inventions" in that they are entirely original or are wider applications of known machinery, though none of them are patented. This is the "Leveler." Its noticeable feature is a "V" shaped, steel-faced wooden section hung at its wide end in a right-angled twelve by seven frame of oak. The tip of the "V" floats free,



Showing "Pockets" for Increasing the Weight of the Road Roller

and the raised bar of that end of the frame serves the double purpose of allowing it to freely follow the road-bed while preventing its rising above the common level of the whole. The specialty of this "V" is this free point. It is hooded by a metal faced shield attached under the point and rising inside the "V" at an angle of one inch to the foot till it reaches the top, four feet forward. This makes either clogging or the forcing of material over the top impossible. A glance at the illustration will show how the drag feeds all the surplus material into the "V," which is held to the crown of the road. The "V," floating automatically, loads up with the excess material and carries it forward to the low places of the road and automatically deposits

it, while the right-angled frame and the drag preserve both the level and the contour of the road.

The usual method of road construction is to crush the rock for the bed and then haul it on to the sub-base. Mr. Clarkson holds this method responsible for the roughnesses in many otherwise perfect roads: A load

touch only the high points, the projections, of a road, tearing them out without disturbing the base. This is intended particularly for the road whose faults are neglect of maintenance, after construction has once been done.

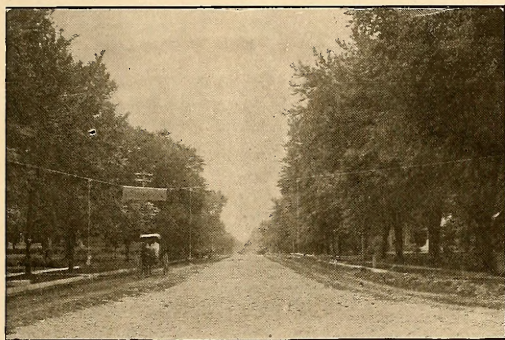
In the practical work of road-building the first step of the 365-Day Road Club is the harrowing. The harrow weighs twenty five hundred pounds and its teeth are twenty eight inches long by two thick. After it has passed over the ground the loosened stones are culled out and piled by the roadside. The graders then bring the road up to sub-grade and the roller passes over it for the first time. The roller purchased by this club weighed five tons—by no means sufficient for the work. A remedy was devised that is as effective as the economy of equipment is welcome: Oak “pockets” were added on either side and filled with stone and scrap-iron. The weight is increased to eight tons ordinarily, but the ten-ton point may be reached when wanted. After the rolling of the sub-grade the rock-crusher is brought into service and a depth of not less than five inches and rarely more than eight of crushed stone is added to the crown. The roller is again passed over this, and then is added the binder, which is the thinnest possible amount of surface soil. With a final rolling, the particular road is finished. All re-built culverts and bridges in this particular road district have been built of concrete.

of rock cannot be dumped on a road-bed without that particular spot being pounded harder than the surrounding parts. To obviate this, the 365-Day Club crushes all its stone on the road itself when the work reaches the point that it is needed. The illustration “B” shows the crusher at work and the men distributing the crushed rock as it falls into the pan. The machinery is moved forward as each fifteen feet is covered.

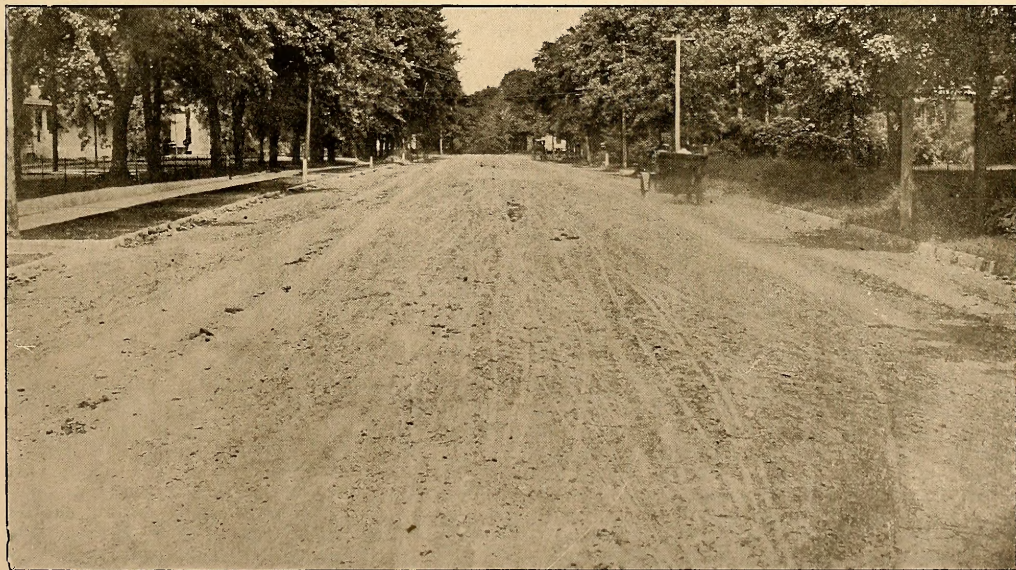
The “Scarifier” is another modification and new application of road building machinery developed by Mr. Clarkson. The distance between the front and rear wheels is twenty feet. The inner section of this also is a “V,” and the frame may be so hung that the teeth

The cost of the work is an ever varying quantity—and averages are nothing if not misleading. Ten thousand dollars have been spent on a single mile of road—yet one of the best single mile of road the club has built was at a cost of \$600, spent for labor and material. In illustrations A, B, C, and D are shown a street in the city of Carthage, as handled by this club. This was done by private subscription, the property-owners placing \$500 in the hands of the club with the request that they “do the best possible for the sum.”

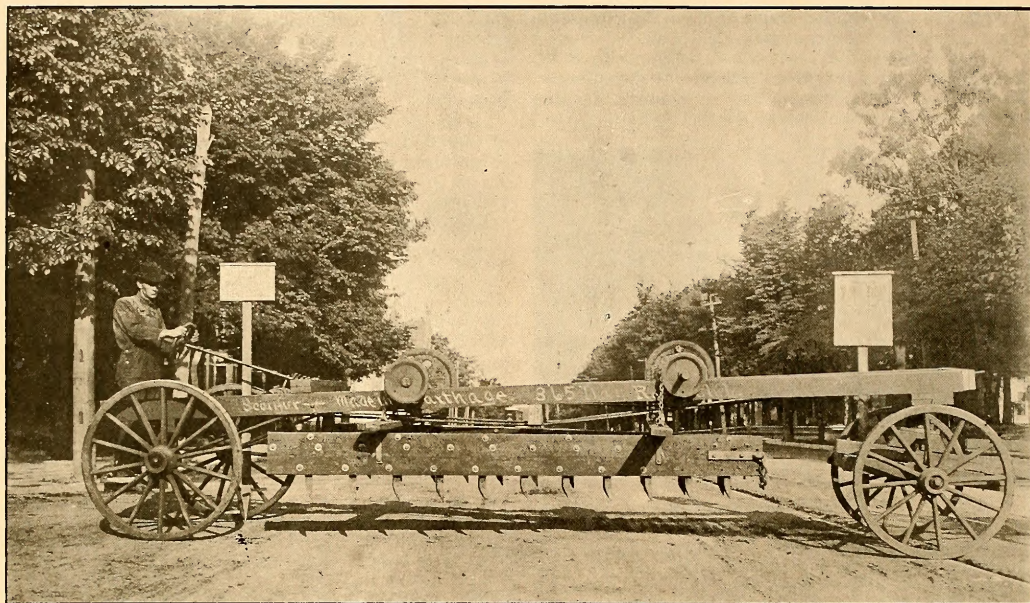
In “A” the graders are bringing the street up to sub-grade. The roller of courses followed this, and



“C.” The Street Ready for the Binder



“D.” A stretch of finished road on the outskirts of Carthage



The Scarifier Used by the 365-Day Road Club of Carthage, Mo. Note the signs on the street corners. These signs are erected at all of the principal corners and road crossings

"B," as already mentioned, shows the rock-crusher at work. The ridge of the original surface-soil, to be used as the binder, may be seen along the side. "C" shows the street ready for the binder and "D" is the finished product. This street is fifty feet wide and the crown of crushed rock is eighteen feet. In length, the street is forty feet short of a quarter of a mile. Ordinarily of course the results shown here would be impossible. The material was all at hand, and there was no charge for the machinery, as it was already the property of the road district and this local club. The fact however that such results may be accomplished so cheaply by co-operation of the district and a private organization show what any locality may hope to accomplish.

But the building of the road is, in the view of this club, almost—almost!—of secondary importance, so emphatically do they believe that the vital point, in this problem of American Highways, is "Maintenance." The very word is pronounced by its members with a sort of reverence. And maintenance means, in their creed, going over every part of the road not less than twice each year with the drag and leveler—the Scarifier is not necessary on a road that has been properly built and properly cared for. "Road Work" as it is usually done has meant an annual heaping of a mountain of loose earth on the crown of the road—insuring for one thing a plentiful supply of dust in dry weather and mud in wet. This emphasized need of more frequent use of the drag insures a lesser quantity of material hauled up at any one time, and the addition of the leveler distributes it to the points needing filling. The material thus replaced is re-absorbed into the road almost unnoticed by the traveler.

The traveler is indeed a mighty factor in the problem of maintenance. The club looks upon him as a sort of partner-after-the-fact and as such they appeal to him. At intervals along their roads, on a card eight-

teen inches by twenty four, this little personal talk is held with him:

THIS IS YOUR ROAD

We are trying to make it better
DRIVE ON THE CROWN OF THE
Road

If you drive on the side of the grade or in the ditch, you break down the grade, make ruts, and increase the expense of keeping up the road two or three-fold.

If there are guide poles laid along the side of the road, they are put there for the purpose of guiding the traffic on the crown of the road, and will be taken away as soon as a track is broken out where it should be.

As soon as the users of the road form the habit of keeping to the crown of the road, except in passing other vehicles, use of the guide poles will be discontinued.

CARTHAGE SPECIAL ROAD DISTRICT.
365-DAY ROAD CLUB.

By J. D. Clarkson, Pres.

Also, that carelessness shall not work harm, a twelve by eighteen inch card, as follows, is erected:

DO NOT DUMP HERE. \$10.00 REWARD

A reward of \$10.00 will be paid for the the conviction of any one dumping refuse or debris upon the right-of-way of any of the roads of this district.

CARTHAGE SPECIAL DISTRICT.

By J. D. Clarkson, Pres.

Furthermore, the club is advocating what is called the "wide Litch." The usual country road, it must be recalled, has four main points of wear: The two paths worn by the feet of the horses and the two grooves worn by the wheels of vehicles. "Good roads" are impossible so long as this disastrous grooving is allow-

ed and on the principle that the cure of ruts is the prevention of them, it follows that every driver of a team must see to it that he at least is not sinning against the law of maintenance. A horse, true to the law of nature, will follow the path of least resistance—in this case, the one smoothed for his feet by those of his kind that have gone before. The Wide Hitch supplies the simplest conceivable remedy: It places the harnessed animal directly in front of, instead of just inside, the line of the wheel. If used from the very beginning of a new road, it follows that the wheel destroys the path; the whole surface of the road presents an equally smooth invitation to the feet of the next team—and the main cause of ruts is very largely eliminated.

"Many bad roads are the result of good material wrongly arranged!" "Put the people in your prob-



One of the double drags made by the 365-Day Road Club. The drag is described in detail in this issue.

lem!" With such insistence does this club hammer on these two vital elements of their success that only the basic truth of them, etching into the understanding in spite of the noise and enthusiasm of their reiteration, saves them from being what might well be called the Club "Yell!" "Build the best possible for the people living now," is another article of their faith. "By building the best we can we are helping our own generation. By taking care of what we build we are passing it on to the next" is the moral sub-base and binder wrought into every foot of the road that the 365-Day

Road Club, of Carthage, Missouri, is adding to the highways of our nation.

Annual Meeting National Paving Brick Manufacturers' Association.

With the Erie County, New York, highways as a study of brick pavement construction for country highways, the eleventh annual convention of the National Paving Brick Manufacturers' Association spent two days of its three days' session out of doors. It was more than an Association gathering, for visiting engineers, highway officials and representatives of technical schools swelled the attendance to nearly three hundred. Association convened in Buffalo, September 9.

Automobiles were used to convey the party over two extensive routes. The first day's trip was designed to observe construction details and the second to afford an example of the excellence of the finished highway. The first day's journey led south of Buffalo along a highway that is designed as a link in an improved road to Cleveland. Paving operations covering several miles and conducted on a large scale gave the visitors a chance to observe and discuss methods of excavation, drainage, foundation laying, curbing, expansion and grouting. Much favorable attention was drawn to a machine for mixing and spreading grout which was a novelty to many of the engineers present. The absence of even the smallest longitudinal cracks in completed stretches of pavement drew much inquiry as to the form of longitudinal expansion joint used.

Noon luncheon was eaten at Roycroft Inn, East Aurora. A banquet that evening at the Hotel Statler and luncheon the following day at the International Hotel at Niagara Falls were social features of the occasion.

The second day's trip led through the City of Niagara Falls, where inspection was made of one of the giant turbine power plants. From that point, the visitors passed over one of the most magnificent roads in the world, both in point of scenery and paving, to Youngstown and Ft. Niagara on the shores of Lake Ontario. This road affords a continuous view of the Niagara gorge and its charm is enhanced by many curves and turns which, however, try the skill of the engineer and road builder. The company pronounced it one of the smoothest and most flawless pavements they had ever encountered.

Four companies were added to the membership list of the Association as a result of the convention. Reports showed the industry to be in a flourishing condition and a suggestion was entertained looking toward the erection of a permanent Association building. The former officers were re-elected as follows: President, Charles J. Deckman, of Cleveland; Vice-President, J. W. Robb, of Clinton, Ind.; Treasurer, C. C. Barr, of Streater, Ill.; Secretary, W. P. Blair, and Assistant, H. H. Macdonald, both of Cleveland.

The conference on the evening of the 9th between the members of the Brick Committee of the American Society of Municipal Improvements and the manufacturers developed many interesting suggestions.

The chief concern on the part of the manufacturers seemed to be for some practical relief in the matter of a greater convenience for inspection.

The city of Birmingham, the L. & N. Railroad, the Southern and the Birmingham Light and Power Co. will construct a viaduct on First avenue. It will carry the tracks of the railways named and will have a 44-foot roadway, with two 8-foot sidewalks. It will cost \$200,000.

County Highway Bridges

By MR. J. N. AMBLER, Winston-Salem, N. C.

EXCEPT in a few localities, the popular interest in "good roads," which is so wide-spread at the present time, did not exist, even as far back as fifteen years ago. At this time however, there are but few counties in the state which are so bold as to put themselves on record as not favoring good roads, or as being indifferent to the benefit to be derived from them.

Roads are now being built which can take care of the heaviest modern traffic, such as motor cars, motor trucks, steam and gas tractors, and other heavy machinery.

Have the highway bridges of the country kept pace with the movement for good roads? The fact that they have not is notorious, and many of the best highways today are crippled in their usefulness by the fact that there has been little or no appreciation, among county officials, that the bridges should be adequate to carry the heaviest traffic which will go over the roads.

Since the old adage that the strength of a chain is no greater than that of its weakest link, applies pre-eminently to this question, a little reflection will show how utterly illogical it is to spend many thousands of dollars in bond issues for modern roads, while even a single bridge, let alone the great majority, are insufficient in capacity to carry modern traffic with proper safety.

At the present time the most modern type of road roller, with its coal, water, driver, etc., will weigh some 21,000 to 22,000 lbs. Heavy steam and gas tractors will weigh fully as much, not counting the weight of a train of wagons which is often attached to them. These weights are also approximated by present day motor

trucks, and the weights and loadings of this style of vehicle are increasing. While the 30,000 lb. road roller is no longer in common use for highway work, in view of what has been said it does not seem wise to design bridges for a concentrated load less than that machine would give, certainly for important highways, while a 24,000 lb. roller is light enough for ordinary highways of secondary importance. Over and above this, an allowance of 25 per cent of the live load, for vibration and impact, should always be made. The tendency is undoubtedly toward heavier loadings in the future.

The fact that bridges have been and continue to be built in violation of the demands of existing as well as future conditions of traffic, is partly the fault of the counties themselves, and partly of the bridge companies.

With the counties, money has been all too scarce, and interest in and appreciation of the bridge question almost entirely lacking, up to the present time.

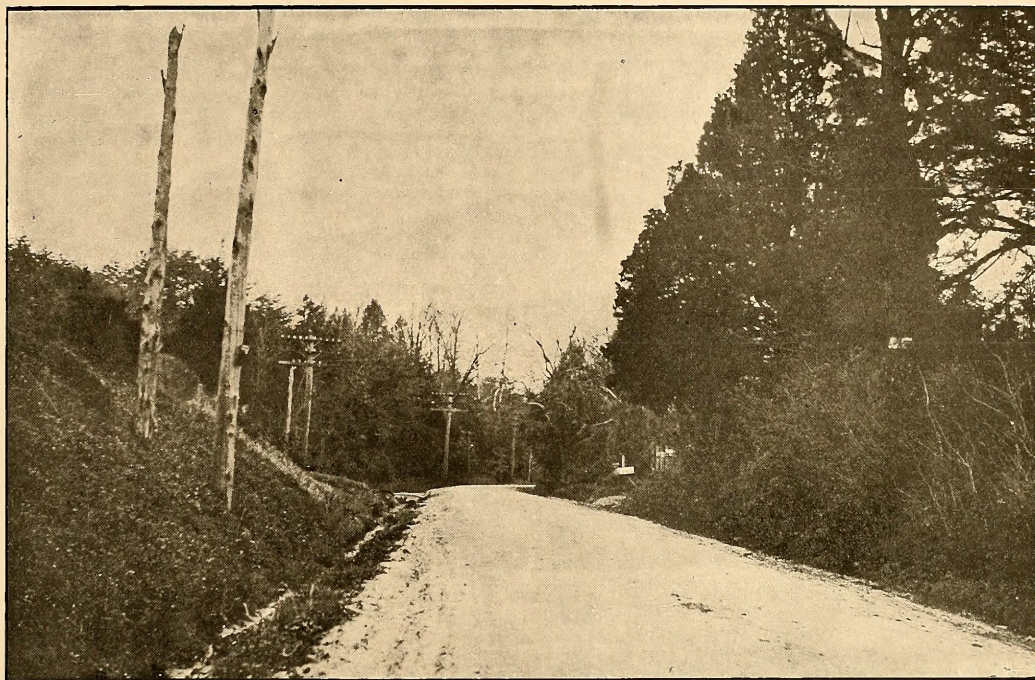
Now the more progressive counties are beginning to realize that the old system of letting bridge contracts is illogical and unbusinesslike, and that good results are not likely to be obtained under it.

Under the old system, the only question which had any bearing whatever on the case was "what is the cheapest bridge which can be built from the near bank to the far bank of the stream."

Loading was not considered, proper unit stresses were unheard of, proper foundations were disregarded, and adequate width was of no consequence and good looks was a matter of amusement, while the floor sys-



A Bad Piece of Road in Spottsylvania County, Va., which has been improved since this picture was made



The Same Road in Spottsylvania County After Improvement

tem and details were not worth thinking about. In other words nothing whatever was involved in the entire question but cheapness.

Often the price was fixed in advance by the commissioners themselves, and bridge companies were told that in no case would the county pay more than \$2,000 for the bridge. Possibly an adequate bridge would have cost \$3,000 or more. Now the bridge companies are met with a choice between building the bridge so cheap that they might still make a profit, or else avoiding all such cases, and as a result, going out of business.

Of course the first alternative is the natural one to be chosen, and then the question of skinning steel, skinning masonry, and skinning the capacity of the bridge would be in order.

Now there are certain limits below which reputable bridge companies will not skin either steel or masonry, while irresponsible companies do not seem to recognize any such limit. The writer once heard the representative of a company, known for its cheap work, to boast that his company could put up a bridge as cheap as any set of county commissioners could desire.

In support of this claim, he exhibited a large batch of blue prints, which required only a casual examination to see that his boast was thoroughly substantiated.

In such bridge lettings as have been described, the county commissioners were admired by their constituents as astute business men, who could out-trade the bridge men. Shades of Julius Caesar! Imagine a county commissioner, who knows nothing whatever of the tricky business of building bridges, getting the best of a bargain with an unscrupulous bridge company; particularly when the bridge company has both the designing and constructing the bridge, in its own hands, not

subject to any check on either, unless possibly that of the county surveyor, who by virtue of his office as the only technical man in the county, is therefore supposed to know all about bridges.

In other cases, where the bridge was a large and important structure, enough bridge men would be present at the letting to give the air of fierce competition.

These gentlemen would have to be introduced to each other, and then each would proceed to bid on his own plans, and also on those of his competitors, until the writer has seen a confusion result, from which it would have been hard to extricate the interests of the county. Little did these commissioners suspect that under all the arguments and personal clashes between the bridge men, an understanding had been reached the night before in a nearby city, under which it was decided which company would get the contract, and that at a price sufficiently higher than a proper cost of the bridge, to allow of a snug sum to be divided up between all the "boys present."

In other words a first class "pool" has been pulled off over the good and unsuspecting commissioners.

At the present time there is undoubtedly competition of every character, proper and improper, in the case of small bridges, which when unchecked result in the skinning already explained. How far real competition may be had in the case of a large and important bridge is doubtful. It doubtless depends upon how the various companies are circumstanced at the time of bidding.

Who is to blame for this deplorable state of things? Bridge companies are certainly to blame for a pool, or any other deception, and for much of the faulty, designing and construction. There are extenuating circumstances however. They say that as long as county

commissioners want only cheap bridges, they have to build them, or else go out of business, and that other practices have been forced on them by the counties. The writer has known of several instances where they have been treated with shameful injustice. In the writer's opinion the blame rests very largely on the county commissioners, also with extenuating circumstances. Commissioners should be men of sufficient intelligence to realize that bridge design and construction is a very highly technical matter, so technical as to be entirely beyond their comprehension, and should be of sufficient business experience to know that they cannot best bridge men at their own game, a game entirely in the bridge men's hands.

Some counties have men of the intelligence and ability to appreciate these issues and who are willing to serve as county commissioners, and to them we should look for a gradual emancipation from the present practices in bridge building.

The day for "good bridges" as an important factor in the movement for "good roads," is beginning to dawn.

Bridge companies act as engineers in designing the plans which they offer and as contractors in building them. This places the entire matter in the hands of the company, and ordinarily the counties' interests are not represented at all, certainly not by anyone who knows anything whatever of bridge design and construction. Everyone should know that no amount of business ability in the commissioners will take the place of technical training, and experience.

In the early days of bridge building there was some excuse for the companies acting as engineers and contractors, on the same job. Bridge engineering was in its infancy, there were no adequate bridge courses at engineering colleges, and no laboratories or testing equipment for experimental work.

The bridge companies developed these subjects and are primarily responsible for the present state of knowledge of designing and constructing bridges.

At present, however, a number of institutions offer higher practical courses in bridge engineering, and while, because of lack of demand, there are not enough engineers in the country who are sufficiently experienced in bridge design to handle the bridge work everywhere, their number is increasing, and this is a great step in the right direction.

Where such engineers can be had, there is certainly no more reason why bridge companies should do both engineering and constructing, than that water works, sewer or railroad contractors should do it.

The disadvantages of the present system will never be removed, until counties employ competent and experienced bridge engineers, independent of affiliation with all bridge companies, to design their bridges, and supervise their construction.

All cities, who know anything of public works, as well as railroad companies and other corporations, feel and know the importance of having the services of a competent, disinterested engineer, acting in their service and to their interests, and will not do work on any other basis.

To allow one and the same person to be both engineer and contractor, is illogical, unbusinesslike and not necessary. No certain or economical results in the interests of counties are likely to be obtained in departing from the experience of cities railroads and the larger corporations in this respect.

They have found that the small cost of engineering service is abundantly justified, and all are large employers of engineers.

How unlikely is it therefore, that counties with less knowledge and experience will be able to improve on their methods, and still persist, from force of habit, in pursuing a course contrary to all business experience, and the dictates of ordinary common sense.

The question may now be asked, in what respect will an engineer be able to help a county with a proposed bridge?

I will answer categorically that if he is competent by training and experience, he can help in the following definite ways:

(1) In assisting them to select the site of the bridge.

The importance of the traffic will determine the general situation of the bridge, but the actual spot is best determined by the engineer, in view of length, foundations, and proper approaches at the ends, from the highways on either side.

(2) Having agreed upon the exact location, the engineer should then be instructed to make a precise survey. This will show the position of rock abutments if any, the banks, rock ledges for piers, etc.

Accurate levels should be run over the center line of the bridge, as already staked out.

These should show the elevations of the surface of water, bottom of river entirely across, top of banks, and the slopes of the hills for some distance beyond the ends. Soundings should show the position of rock, and the highest known flood level should be ascertained and shown.

(3) With the map and profile prepared from this survey, the engineer is enabled to determine the best and most economical arrangement of spans, the kind of spans best suited to the conditions, as well as the proper elevation of the bridge to escape floods.

He can also determine the proper width and height of the bridge and the loadings for which it should be designed, as well as the safe allowance for wind and flood current. He then proceeds to work out what the stress in every separate member of the bridge is, not only for the dead load and wind load, but for the most unfavorable positions of the live load.

He then works out the sizes and cross sections of the steel work to meet these stresses with safety. Places for the piers and abutments are worked out, and complete specifications for foundations and superstructure are made.

In the case of concrete arch bridges, the procedure is similar as to its object and result.

(4) The engineer can be of great assistance in letting this contract.

Having figured up the amount of material in the bridge, and applying current prices, he knows what the bridge ought to cost. The county commissioners have no means of knowing what the bridge ought to cost, while the bridge salesman do know. When the county is represented by a consulting engineer, who also knows about what the bridge should cost, it is likely that a great saving will be accomplished.

If the bids on say, a steel bridge are all unreasonably high, the engineer suspects a "pool," and is in a position to advise the county as to the practicability of building a concrete bridge, a bridge composed of short I beam spans, or even a wooden bridge of approved type. Since concrete bridges are built by an entirely different class of contractors, and I beam bridges can be made in any machine shop, and a wooden bridge can be built by any building contractor of experience, the county does not have to fall victim to a pool of bids.

The writer knows no other way of handling a pool, as effective as to be independent of those making it.

Now the other extreme of cut throat competition on small bridges, resulting in giving the contract to the most unscrupulous skinner of steel, is also avoided, because the companies are all bidding on fixed plans and specifications prepared by the engineer representing the county. His design is intended to be the most economical that should be built, not the cheapest that can be built. The assistance of the engineer will also save much confusion to the counties in his telling them what bids are irregular and improper. This is also a protection to the reputable bridge companies, as it insures them a square deal, removing the improper advantage that the shyster would have over them under the old system. If the practice recommended were pursued generally, it would do much to remove the low trickery and rascality which has often characterized bridge lettings.

Bridge building would be on a business-like basis, and the confidence of the bidders that they would all be treated exactly alike, without fear or favor, and would get a square deal, would tend to lower the cost of bridges everywhere.

(5) After the contract has been let and signed, the engineer should be employed to give necessary supervision to construction. Since the foundation work is of the utmost importance, and lends itself so easily to deception, by insufficient care in preparing the subfoundation, leaving out cement, and putting in bad sand, and in many other ways, an inspector, working under the direction of the engineer, should be on the work at all times while the masonry is being put in, while the engineer should visit the work at intervals.

In the case of a concrete arch bridge, the most careful and persistent inspection and supervision are necessary. The fact that this supervision has usually been lacking, accounts in the writer's opinion for nearly all the cracking up and more or less partial failure of so many concrete bridges. Since it is impossible to tell much about concrete after it is finished, the only business-like thing to do is to see that it is put in properly at first. In no other way can the advantages of this material be realized.

The steel work does not require constant supervision, but should be visited by the engineer at intervals, before painting. Since we assume that the bridge company's shop drawings have been approved by the engineer, and certainly in the case of an important bridge, an inspection covering the chemical and physical character of the steel has been made at the mills and shops, by one of the independent inspection bureaus, it only remains to be seen if the various members are of proper strength, that is that they have the sizes and weights shown on the plans, and that the work is properly erected. The weights of steel can be determined by the engineer by means of a pair of calipers, and comparison with the detail thickness and other dimensions given in the mill catalogue.

The painting should be carefully specified in the plan and inspected in the field. Railroad companies generally buy paints subject to the specifications and tests of their chemist.

An entire paper could easily be given to this subject. If practicable to apply the test, the bridge should be actually tested with the heaviest load for which it is designed.

The engineer, when satisfied that the bridge is properly built, and that the contract has been complied with, in every respect, should so certify to the county commissioners, and thereupon they should pay for the bridge promptly. The delays and difficulties in getting their money, are serious grievances of which bridge

companies complain. If generally, they are treated in a fair and business-like way in this respect, they could bid closer, and much money would be saved throughout the entire country.

Summing up the entire matter, it should be stated that building bridges is a business—a highly technical business, and to get business-like results, an engineer, who is simply a technical business man, should be employed to assist the county commissioners, exactly as they employ a lawyer to assist them in their legal business.

It is foolish to build bridges out of keeping with the



Horn Valley Road in Buncombe County, N. C.

roads on which they are situated, and which will not handle present and future traffic demands.

Since county commissioners cannot be expected to know how to design or construct bridges, any more than they can be expected to know how to handle a legal battle, it is logical to employ someone whose training and experience enables him to assist them to get safe, sure and economical results with the bridges of the county.

It is reasonably sure that no such results can be depended on under the present system of seeing who can prepare the cheapest, and therefore weakest design, putting a premium on this style of chicanery, and often letting the contract to the smoothest-tongued and most consummate knave in the bunch.

The writer wishes to see a realization by all counties

of the fact that past conditions should be and can be remedied, that all bridges should be designed by competent engineers who represent the counties, that all bridge companies should bid on the same basis, and no sneak bids be received, or other features allowed which would tend to destroy the confidence of the bidders that they are being treated with perfect fairness and that the construction work be supervised and accepted by an engineer, and the bridge companies be paid promptly, and in full.

The officials of several of the most reputable bridge companies, with whom the writer has discussed the situation, have expressed their belief that it was not only best for the counties to have their plans prepared by an engineer, provided he was competent to design bridges, but also for their companies, as a reputable company is usually well equipped with machinery and appliances and with their organization can put in a lower bid on a fixed set of plans, than the shyster can.

In other words, this plan if carried out, would put a premium on the company best equipped to do the work, rather than on the shyster who is poorly equipped.

It goes without saying, however, that the plan as outlined, will be fought bitterly by the shyster, because it is an invasion of his field of activities, and tends to creating conditions which will take the premium off of his methods.

When the shyster is confronted with a set of plans and is told that his bid must be on them, or on none, he is deprived of the advantage previously enjoyed of preparing a plan of his own so cheap and weak that his reputable competitors (who have sufficient tangible property to be liable,) cannot follow him.

He is also deprived of designing the bridge to use such old remnants of steel shapes of various sizes and characters as he may have left on his yards.

There is nothing for him to do but to attack the ability of the engineer, and see if he can't get in such close personal touch with some of the commissioners, who think that engineering is nothing but nonsense anyway, as to create a doubt in their minds as to the plans.

Sometimes the opposite course is pursued the engineer is highly praised, and the design is pronounced a most superior one indeed. However, it is pointed out, "You commissioners can't afford to build a bridge like that. Why we can put up one for not much over half of what that one costs." They speak truth, for they not only can, but will do this very thing if allowed to do so.

A good answer for the commissioners to give is that our engineer states that he also can design one to cost half as much as this, and if necessary, could design one even lighter still, so light in fact that he would not dare drive over it himself, when completed, but he states that the bridge, as designed, is as light a one as we should build, in the interest of the people.

While the course outlined in this paper is aimed primarily at benefitting the counties, it cannot fail to be of benefit to all bridge companies who take pride in their work and are willing to give a square deal themselves.

For one to oppose a movement intended to put bridge building on a more honorable and businesslike basis, with fairer and more certain results, for the company and county alike, would seem to the writer to be an admission by the company, that they were not in that class to which such an appeal could be made.

The writer will never cease to bring the importance of "Good Bridges" to the attention of county officials, as far as his limited ability with word and pen allows,

and if this paper has in anyway awakened interest in this long neglected subject, he will be satisfied.

The Austin-San Antonio Post Road.

The Austin (Texas) Statesman says that actual construction work on the Texas post road between Austin and San Antonio will be delayed about a month in the light of instructions recently received from officials in the Office of Public Roads at Washington, D. C., by W. A. Crossland, senior highway engineer, who has charge of the Texas post road project. Mr. Crossland said it was his original intention to have the surveys drawn up and to advertise for bids on the construction work and to allow that work to go on as soon as the survey in any of the counties on the line was finished, thus building that part of the road for which the survey was finished without waiting for the completion of all the surveys. Instructions received from Washington recently, however, were to the effect that all the surveys together with the specifications of the road must be finished and sent to the Office of Public Roads for approval before any of the construction work was done.

Work on the surveys is progressing rapidly, Mr. Crossland said. Engineer Winans, who has in charge the making of the survey for the part of the road that lies in Travis County, has completed the survey for that part and with his assistants is now at work making cross sections of the road as it is now is. The cross-sectioning will be finished soon.

Engineer Wells, in charge of the survey work in Comal County, has about finished the survey and all the field work and platting for that part of the line has been about finished.

Engineer Janssen is carrying on the work in Hays County rapidly.

Mr. Crossland said that if an engineer did not come soon to begin the survey work in Bexar County he would assign the engineers in the other counties to the work as soon as they finished their own surveys and complete the Bexar County survey, cross sectioning and platting rapidly with the combined efforts of the three engineers who are now working in Travis, Comal and Hays counties.

Mr. Crossland, himself, is writing the specifications for the complete line and he said they are about complete. It will be a month, however, at least, he said, before all the surveys, cross-section work, platting and other details were completed for the entire line and the plans sent to the officials at Washington.

"There is more work required on the surveys of this road than on any other post road I have ever seen," Mr. Crossland said. "The surveys are certainly going to be for a first-class road, all right. We are making the very same kind of surveys that would be required for the building of concrete or brick road, although this road will be a gravel road. The plan of the authorities is to make it very high class."

A good deal of work will be required on the part of the road that lies in Travis County, Mr. Crossland said. The line of the highway in this county is very rough and will necessitate a lot of leveling.

The Maryland State Roads Commission has contracted for two sections of the Hanover street bridge across a branch of the Patapsco river in Baltimore, at a cost of \$667,897. This bridge is to be 70 feet wide, 45 feet above the water and 2,300 feet long.

Dade County, Florida, will contribute \$10,000 toward the expense of bridging New river.

The Appalachian Park Movement as Related to Roads

By MR. GEORGE N. POWELL

Secretary Appalachian Park Association, Asheville, N. C.

NATURE has provided in the Southern Appalachian mountains a number of the most attractive and useful natural parks to be found in this country, especially is this true when location, climate, water and scenic beauty are taken into account. So far back as 1899, a number of public spirited men of the southern states called a meeting at Asheville for the purpose of formulating plans for opening up the Southern Appalachian mountains to the people for pleasure and recreation. At this meeting the National Appalachian Park Association was organized and among the moving spirits in this meeting was Honorable Locke Craig, the present good roads governor of North Carolina and Honorable Josephus Daniels, now Secretary of the Navy. Public interest in the movement was awakened to such an extent that Congress in 1911 passed what is known as the Weeks Law authorizing the acquirement of lands located on the water sheds of navigable streams, for the purpose of securing the perpetual growth of forests, preventing floods, protection against forest fires, preservation of water powers, preservation of water powers, preservation of water supply of towns and cities, a continuance of timber supply, and preservation of the beauty and attractiveness of these mountain lands for the recreation and pleasure of the people.

The National Forest Reservation Commission, consisting of the Secretary of the Interior, the Secretary of Agriculture and two members of the Senate and two members of the House of Representatives, was created to purchase as provided in the Weeks law and an appropriation of ten million dollars was made to carry out the provisions of this act. Up to this time the commission has approved for purchase an area of about one million acres in the Southern Appalachian mountains and about two hundred thousand acres in the White mountains, and has proposed an area of about six million acres in the Southern Appalachian mountains in which purchases are to be made. These lands lie in Virginia, North Carolina, Tennessee, Alabama, Georgia and South Carolina.

It is generally recognized that these lands have been economically purchased and wisely administered so far as present appropriation will permit, and even at this experimental stage in carrying out the provisions of the Weeks Law the people are beginning to realize that the movement is national in its benefits and that Congress should make adequate appropriations to enable the commission and Forest Service to carry out the full purposes of this act.

Within the last year it has come to the mind of those who have been interested in this movement, since its inception, that provisions should be made for the construction of a system of highways through these national forests, to be laid out with a view of the states and counties constructing links between the national forest, thereby making a great scenic highway extending from near the national capitol along the crest of these mountains to the southern end of the national forests in Georgia and Alabama, with this system of roads completed, and trails leading down to the many beautiful streams, having their source near the crest of

these mountains, and hotels, cottages, and camps erected on sites leased from the government, there would be made easily accessible one of the most beautiful and picturesque mountain regions in the world. This would attract thousands of wealthy tourists who now visit the mountain regions of Europe, thereby adding to the economic features of the Weeks Law. These forests would be within a day's journey of thirty million people, among whom are thousands of teachers, students, clerks and professional men and women who would avail themselves of the opportunity to spend their vacations in this region, accessible all the year round, and in reach of settlements where comfortable and cheap accommodations could always be found. These national resources of scenic beauty, and other attractions, are valuable national assets, and they have been so demonstrated in European countries. For instance, Switzerland has one hundred and fifty million dollars invested in tourist hotels, which is being added to each year and it is understood that the tourist business is the chief source of that country's wealth.

The National Government has constructed good roads through the national parks of the West for the use of the people for recreation and pleasure and this is endorsed by the public as a wise policy. The people should have the same full use of suitable parts of the national forests of the East, for recreation and pleasure, as they have in the national parks of the West, and it is desired to see this accomplished without, in any way, interfering with the administration of these forests under the Weeks Law, or, in any way, prohibiting the full use and development of all the natural resources of these forests.

In order to bring these facts to the attention of the people, the Appalachian Park Association was formed last fall with Governor Craig of North Carolina as President. Among the vice-presidents were the Governors of Alabama, Virginia, Georgia, South Carolina, and Tennessee. Others are Hon. Charles Lethrop Pack, New Jersey; Hon. Josephus Daniels, Secretary of the Navy; Mrs. Williams Cummings Story, president General National Society, D. A. R.; Hon. P. P. Claxton, Commissioner Bureau of Education; Mr. Mark W. Potter, President C. C. & O. Railroad, New York; Mr. Fairfax Harrison, President Southern Railroad, Washington, D. C.; Mr. S. Davies Harfield, President Continental Trust Company, Baltimore, Md. Dr. Geo. Frederick Huns President American Scenic and Historic Preservation Society, New York; Mr. Geo. F. Baker, President First National Bank, New York; Hon. J. O. Roper, First Assistant Postmaster General, Washington, D. C. and Hon. E. J. Watson Commissioner of Agriculture, Columbia, S. C.

A vigorous campaign was inaugurated to secure endorsements of the purpose of the association. Up to this time the movement has been endorsed by the leading business organizations of Chicago, New York, Baltimore, St. Louis, Norfolk, Atlanta, Washington City, Asheville, Columbia, Spartanburg, Chattanooga, Augusta, Jacksonville, Knoxville, Tampa, Charlottesville, Miami, Raleigh, Winston-Salem, Greensboro, Bristol, Fayetteville, Rocky Mount, Salisbury, Mobile, and

Goldsboro; also farmers' clubs, labor unions, women's clubs political conventions; altogether representing several million people, besides numbers of newspapers and in dividual endorsements throughout the country, wherever the movement has been brought to the attention of the people, it has met with approval and hearty co-operation. This applies not only to the south but to the entire country, and while our efforts have been confined largely to securing endorsements for developing the national forests of the Southern Appalachian mountains, we stand ready to co-operate with a movement for similar developing in the White Mountain National Forests.

There is a growing sentiment throughout the country in favor of national aid and co-operation in the construction of good roads. It is probable that the national public road construction in the near future. There is, however, a disposition on the part of Congress to show its friendliness to this movement and we can imagine no more feasible plan to do this than to begin in an experimental way the construction of a system of highways through the national forests of the Southern Appalachian mountains where the states and counties will co-operate. The arguments for this plan are particularly strong by reason of the national benefits to be derived from these roads.

The association proposes to hold a conference in Washington soon to formulate plans that is believed will receive the support of the Governors, Senators and Representatives from the states mentioned, the National Forest Reservation Commission and the Forest Service, which in our opinion will result in securing from Congress the necessary legislation to carry out the plans outlined, and which we believe are general in their benefits.

The Tennessee River Bridge Commission, of Hamilton county, Tenn., has completed plans for the construction of a bridge to connect Chattanooga and Hill City. It will be 2,450 feet long and will cost \$500,000

Fall Touring in the South.

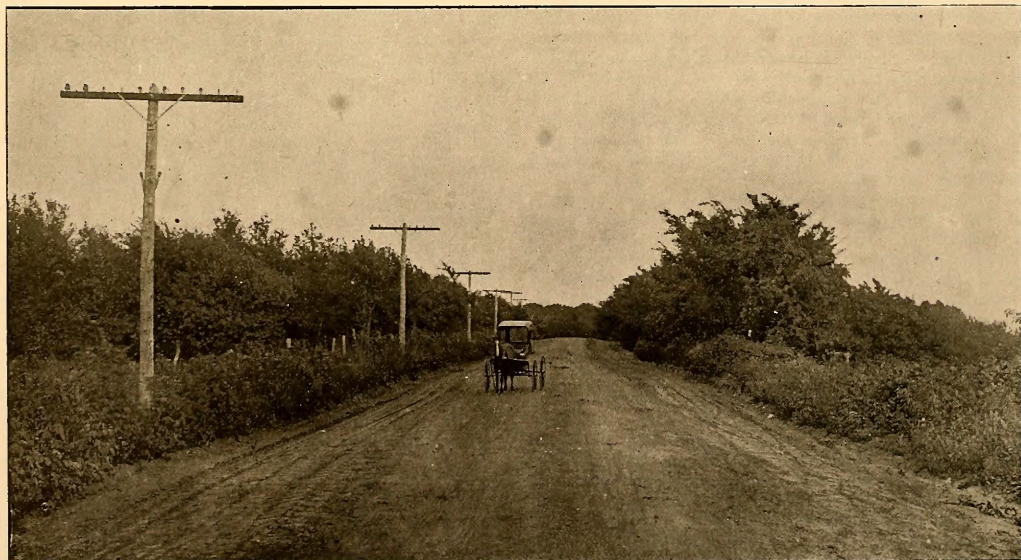
Fall touring is exceedingly popular, reports the American Automobile association bureau, which serves the entire country, for at this time of the year the trunk roads are in as good or better condition than in any other season, particularly as the principal road work in process in the spring and summer is largely completed.

Recent developments on the route from Roanoke, Va., through Bristol and Knoxville to Chattanooga give the assurance that this line will be open to through travel with few handicaps beginning in 1915. When entirely complete, and as connections are supplied from Chattanooga through Birmingham to New Orleans, this will make the shortest and most strategic route between New York-Philadelphia and New Orleans. Great improvements are being made, particularly by the counties on that part of the route between Bristol and Chattanooga.

Grade crossings continue to form a menace of which only too few motorists are sufficiently appreciative. A highway authority is responsible for the assertion that 15 per cent of all persons killed or injured in grade crossing accidents are occupants of automobiles. The total casualties to motorists from this source, if known, would be appalling. Yet it is useless to expect the railroads immediately to install bridges at every crossing. The capital required for such a reformation of rights of way is beyond the resources of any road. The only instant source of relief from risk lies with the motorist himself in conceiving a proper respect for the risk that is involved in "shooting" a blind crossing, or—worse yet—of taking an open crossing without first looking up and down the track.

Dade county, Florida, contemplates appropriating \$10,000 to aid in the construction of a bridge across New River.

Biloxi, Miss., will rebuild bridge across Back Bay at a cost of \$10,000.



A finished road near Carthage, Mo., built by the 365-Day Road Club

The Meeting of the Alabama Good Roads Association

By MR. J. A. ROUNTREE

Secretary, Birmingham, Alabama

The Eighteenth Annual Session of the Alabama Good Roads Association convened in Montgomery, Ala., Oct. 21st-23rd. It was one of the most successful meetings in the history of the association. It adopted the most practical plans for future good roads legislation. Only practical speeches were delivered—those that will be of benefits in advancing the cause of good roads and instructing the people how to build and maintain roads.

The annual report of Hon. John Craft, president, was full of splendid ideas on road building and suggestions for good roads legislation.

Secretary J. A. Rountree submitted his annual report, in which he reported that 23 county good roads associations, 10 local and 5 highway associations had been organized in Alabama during the past twelve months. Ten counties organized good roads association. He also reported that during the year a total of \$2,833,747.67 were expended on roads and bridges by the state of Alabama. At present, according to official reports there are 49,639 miles of roads in Alabama, of which 5,772.39 miles or 11.63 per cent are improved. The Alabama Good Roads Association has aroused interest in the various counties of Alabama and urged them to take advantage of state aid. They have also assisted in conducting bond issues and special tax, as well as to improve the roads by bond issues. Only one county in the state has defeated the bond issue this year. Secretary Rountree's report was received with much enthusiasm and applause and he was warmly congratulated over the splendid work of organizing that had been accomplished by the association during the past twelve months.

The convention was honored with the presence and addresses by United States Senator John H. Bankhead, Governor O'Neal, Governor-elect Chas. Henderson and other distinguished speakers. Everything was done by the Montgomery people to make the meeting a great success.

Mr. A. E. Ausman of Ohio, organizer for the United States Good Roads Association delivered an able address on "Systematizing Highway Building." He incidentally reported the great work the United States Good Roads Association, of which Senator John H. Bankhead is president, was doing to accelerate the systematizing of building of highways and consolidating good roads associations.

Mr. A. G. Batchelder, of Washington, D. C., Chairman of the Executive Committee of American Automobile Association was in attendance and delivered a well timed address on "The Help the government should give good roads." Mr. Batchelder is a pleasing speaker and his address was well received.

The following officers were elected: Hon. John Craft, Mobile, who has served the association for the past six years was re-elected president. Mr. J. A. Rountree of Birmingham, who is a charter member of the association and for eighteen years has been Secretary, was re-elected for the nineteenth time. Messrs. John W. O'Neill, Birmingham; J. E. Pierce, Huntsville; Senator J. H. Bankhead and Oscar Underwood were elected vice presidents. The following is a list

of the vice president and members of the executive committee.

First, J. D. Bloch, of Mobile; Second, F. J. Dean, Evergreen; Third, J. B. Lyons, Opelika; Fourth, E. B. Deason, Clanton; Fifth, C. E. Thomas, Prattville; Sixth, W. W. Ogden, Sulligent; Seventh, Gardner Greene, Pell City; Eighth, W. V. Skeggs, Decatur; Ninth, L. B. Pennington, Birmingham.

The Executive Committee from the state at large: Chas. Henderson, Troy; C. G. Abercrombie, Montgomery; R. P. Mobson, Greensboro; Hugh McGeever, Birmingham; Thos. E. Kilby, Anniston; H. K. Milner, Birmingham; Chas. B. Hervey, Mobile; J. W. Shepherd, Jasper; Robert Moulthrop, Eufaula.

Executive Committee by districts. First, J. W. Kyser, Burnt Corn and W. H. Holcombe, Mobile; Second P. J. Cooney, Foley and J. N. Cook, Montgomery. Third, G. N. Mitcham, Auburn and D. C. Turnipseed, Union Springs; Fourth, V. B. Atkins, Selma and F. A. Gullede, Verbena; Fifth, J. W. Overton, Wedowee and J. A. Wilkerson, Prattville; Sixth, W. D. Seed, Tuscaloosa and W. F. Fitts, Tuscaloosa; Seventh, L. L. Horsberg, Gadsden and W. T. Brown, Ragland; Eight, G. A. Nelson, New Decatur and R. E. Pettus, Huntsville; Ninth, Daniel Greene, Birmingham and J. F. Kelton, Onconota.

The resolution committee reported resolutions urging Governor O'Neal to set aside two days each year to be known as Good Roads Days and make them state holidays. A resolution urging that congress take action at once for federal aid was also accepted. A resolution of thanks to the Chamber of Commerce, City of Montgomery, Montgomery county and the press were unanimously adopted. The following is a report of the Legislative Committee, which is the platform of the good roads advocates of Alabama and will be pushed forward by the Alabama Good Roads Association. An effort will be made to have the Alabama legislature to enact the same into a law at the 1915 legislature of the state.

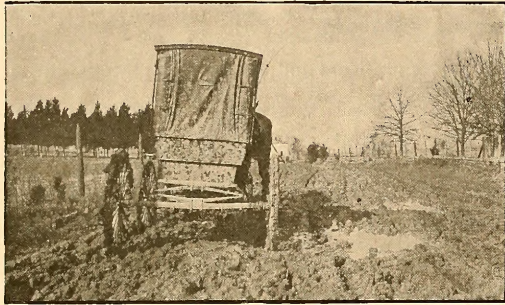
Legislative Committee.

The Alabama Good Roads Association in convention assembled hereby adopts this platform and instructs and directs the legislative committee of this association to prepare bills in accordance with this platform and present the same to the coming legislature for enactment.

The legislative recommendations of the committee were then brought before the convention. Eight recommendations were made and each of these were discussed and adopted separately. A few minor amendments were made and the recommendations as adopted were as follows:

First, That the highway commission be made a permanent department of the state government, with such added powers as experience has demonstrated are advisable and that such commission be charged with the duty of collecting the automobile tax; that said commission have the power to employ a competent highway engineer with the general powers and duties as contained in the present law.

Second, That all moneys collected under the automobile law be segregated and kept as a separate fund in the state treasury for use on the public roads. That 75 per cent on such tax be apportioned to the state, and 25 per cent to the city or county. That such tax be col-



A Very Bad Road in Spottsylvania County, Va.

lected by probate judges or other agencies in the county authorized by the state highway commission.

Third, that we favor immediate legislation, thereby the labor of the state convicts may be utilized on the public roads.

Fourth, That we favor an increased appropriation from the convict fund and recommend that not less than 60 per cent of such fund be appropriated for aid funds be first expended on trunk lines.

Fifth, We strongly urge a constitutional amendment modifying or amending the present constitutional provision that the state shall not engage in internal improvements, so as to permit the state to build and maintain state roads and bridges under such regulations as may be provided by law.

Sixth, We favor the enactment of a general law whereby more efficient administration of the road work in the several counties of the state may be secured.

Seventh, We favor such legislative enactment as will provide religious instructions to county convicts.

Eighth, We strongly urge the enactment of a law that will give to the county road authorities jurisdiction and authority over designated streets through municipalities that may form part of a continuous county highway, so as to give the county authority to build and maintain the street through the municipality as part of the public county highway. We further favor the repeal of the provision of the law which now requires the county to pay to municipalities a part of the bridge and road fund, and the enactment of law requiring all funds collected for road purposes to be expended by the counties under such regulation as may be provided by law.

Ninth, We urge the next legislature to pass a law setting aside two days as good roads days for the working of the public roads and that the same be legal holidays.

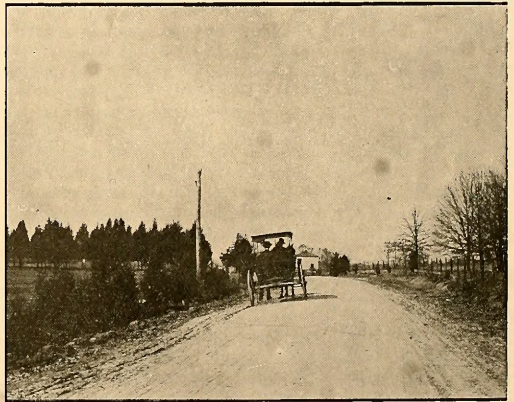
The last day of the convention was devoted to a tour of Montgomery county roads in which a 75 miles drive to the public roads. We further recommend that such in automobiles were taken and a splendid lunch served to the delegates. Before leaving the city representatives of Pathe Weekly and the Universal Film Company took moving pictures of delegates leaving the capitol, headed by Senator John H. Bankhead and Governor O'Neal. Views were taken in various parts of the city with the delegates as the prominent feature.

These pictures will be shown in 12,000 picture houses throughout the United States and it is estimated that over thirty million people will see them.

A Good Roads Prediction for the Southern Appalachian Region.

In his report to the Chamber of Commerce, of which he was a delegate at the recent good roads meeting at Bristol, Va.-Tenn., A. N. Sloan, commissioner of streets and sewers, Chattanooga, Tenn., said:

"I found a very representative body of men assembled from the entire Appalachian Range—men of means, men of influence, engineers, county and city officials, including representatives from various other organizations of a similar nature. I was very much interested, and did what I could to add to the benefits to be derived from the association's meeting. I feel that much impetus was given to good roads, and it was really remarkable to hear just how much work is being done, and also to learn of the plans laid for a greater work for the future. This good roads proposition, in my opinion, is doing more for the benefit of the farming communities than any other proposition today before our people. Thousands of miles of good roads have been built within the past three years, and I predict that in the Appalachian Range alone there will be more roads built within the next 18 months than has



The Same Road in Spottsylvania County, two years later

ever been constructed since the first settlement of the country.

"It is a privilege for anyone engaged in road or street construction work to be called upon to visit an association composed of such men as I met at Bristol, Tenn."

The Texas Immigration Information bureau of Dallas has mailed out requests to every commercial club, good roads and auto organizations of Texas, to petition Gov. Colquitt to designate by special proclamation November 3 and 4 as good roads days on which occasion the citizenship of Texas statewide turn out and work the public highways and roads. It is hoped that by emulating the example of other states in this respect, Texas will make good roads day an annual event.

A re-inforced concrete bridge will be built across Rock Creek on Pennsylvania Avenue in Washington city to cost \$160,000.

Road Improvements in Mecklenburg County, Virginia

By MR. WM. G. BROWN

Resident Engineer. Virginia State Highway Commission, South Hill, Va.

THE good roads fever attacked Mecklenburg county some five or six years ago, the first bond issue elections being held in Clarksville and Chase City districts for \$50,000 and \$60,000, respectively. The program of improvements was carried out and the fever spread over the county to such an extent that in 1911 five other districts in the county voted bond issues aggregating \$240,000. The proceeds are nearly or quite exhausted except in two districts, Boydton and Buckhorn, which districts will probably continue their work for twelve months longer with forces sufficient to build from one and a half to two miles of top soil roads per month in each district. There remains now only one district, Bluestone, to issue bonds, and there is every reason to believe there will soon be an election in that district, the idea being to wait till the convict force is available for the work. A force of from 35 to 50 convicts has been at work in the county continually for more than five years. Under the state law there may be only one force in a county at a time. Thus far Chase City, Clarksville, and Boydton districts have had the use of the convicts at the state's expense, the camp being now in Boydton District. The use of the convicts has proven very successful, especially with the quarry work and macadam construction. Unless there is a change in the statutes governing the convicts, it is safe to predict that a force will remain in Mecklenburg many years.

There have been built 229 miles of macadam and top soil roads in the county and this puts Mecklenburg well in the front ranks of the good roads movement.

Most of the macadam was built in the early stages of the work, the subsequent introduction of the top soil construction (a term for convenience used to include soil, sand-clay, and gravel) almost entirely supplanting macadam. These top soil roads have proven very satisfactory, and it is the opinion of some of our most intelligent good roads people that except where there is unusually heavy traffic, they are preferable to water bound macadam, aside from consideration of cost. With average conditions in the county, the cost of top soil construction is probably less than one third the cost of water bound macadam. For ordinary traffic, a well built top soil road can be maintained for probably two thirds the cost of maintaining average waterbound macadam for the same traffic.

For the most part the work by the districts has been done by force account, net cost plus 10% but in some at actual cost, the districts purchasing their own equipment, employing a superintendent and doing the work under the supervision of the local representative of the State Highway Commission. For the top soil roads this method has worked especially well. There is such a diversity of conditions and the necessary depth of top soil to make a road of uniform strength is so variable that it is well nigh impossible to prepare and have executed by contract specifications that would be both economical and effective. For macadam the contract system has been satisfactory.

Since the coming of the good roads the educational and industrial development has been by leaps and bounds. A local wag aptly remarked some time ago

that Mecklenburg had civilization thrust upon her about fifteen years before she was ready to receive it. Allusion to this remark will be excused by Mecklenburgers when they are reminded that the writer is a resident of Mecklenburg and is himself an enthusiastic Mecklenburg booster. The march to civilization has been accomplished in double quick time over the improved roads.

As is invariably the case, the good roads movement has added impetus to the good schools movement, and Mecklenburg is building up a school system which will compare favorably with any in the state. Farm lands are low in price, but since the advent of the good roads, prices have been rapidly and steadily advancing.

Mecklenburg is fortunate in being one of the counties in the state traversed by the Washington-to-Atlanta highway. The route through the county has been adopted by the American Highway Association, and is generally used by tourists between Richmond and Atlanta. For the purpose of obtaining cost data for maintenance of top soil roads the United States Office of Public Roads has established on this route between Richmond and Atlanta three division engineers of maintenance, who inspect the whole route nearly every week. These engineers are men of long experience in the government service, and there is every reason to believe there will be a greater stimulus towards maintenance in all the counties in which these engineers are employed. Their automobiles are furnished to the government by the American Highway Association at a nominal rental of one dollar per year each. The actual cost of labor and materials in the maintenance is borne by the counties and this is the only cost to them. All the districts of Mecklenburg through which this national highway passes have subscribed to the arrangement and Mr. D. H. Winslow, of Washington, D. C., is the engineer assigned to the division which includes the thirty eight miles through Mecklenburg. The idea of maintenance is on the theory that "a stitch in time saves nine," and that the work of one man and a mule maintaining continuously will accomplish more than the equivalent outlay in a larger force repairing at infrequent intervals. The government engineers hope to install the patrol system throughout the route.

It is difficult to grasp the full significance of this new passenger route from North to South, and few realize the tremendous advantages that must accrue. At least one district in the county, La Crosse, has caught the spirit of the movement and the district road board has erected neatly painted and lettered mile posts throughout her part of the route and have also marked the line between Mecklenburg and Brunswick counties. The other districts will follow suit very shortly as will also Brunswick county.

In another respect Mecklenburg has been fortunate. She has been selected by the United States government as one of the seven counties in the state in which facts and figures will be collected and tabulated to show just how much in dollars and cents the counties have been benefitted by the expenditure of road funds. This survey in Mecklenburg county has not yet been

completed, but it is safe to predict that the results will show a large annual dividend on the amount invested.

A similar survey in Spottsylvania county showed an annual dividend of 41.6%, or \$41,600 saved annually in hauling over roads which cost \$100,000 to construct. It is unlikely that Mecklenburg will show so large a dividend by reason of the fact that her principal money crop, bright tobacco, weighs less per dollar's worth than any other crop in the south.

On this account the tonnage hauled over her improved roads will show up relatively small.

While this article is written primarily in regard to Mecklenburg roads, it would seem excusable to say a word in regard to the writer's home town. South Hill is the center from which five improved roads radiate, and the town has already profitted greatly by the construction of the roads. The national highway runs

through the principal street of the town. This street was built with select gravel soil laid extra width and extra thickness. It has stood the heavy traffic admirably well, and the dust nuisance has been probably less than with ordinary waterbound macadam. The town has a population of some 800 or 1,000 and is a considerable bright tobacco market. In their intercourse with each other, business, social and religious, the people dwell together in unity and there is scant room or tolerance for the knocker. The town's artesian water system, electric plant, and modern hotel are a few of the testimonials of its progressive spirit. The unwritten motto of the town is, "a long pull, a strong pull, all together."

In behalf of the citizens of Mecklenburg county the reader is extended a most cordial invitation to come where good roads lead from good farms to good towns.

Tarrant County Roads Stand the Test

By R. D. McCORMACK, Fort Worth, Texas

IF THE TEST of summer heat is stood as well as was the winter cold—below freezing—and the stress of storm and flood, then it may be said that Tarrant county has found the "ideal" in road building in her new asphalt surfaced macadam roads.

Under a contract with J. C. Travilla the county is building 1333 miles of this type of highway, a work that is about two-thirds to $\frac{3}{4}$ done. Mr. Travilla was the man who planned the roads and he has the general supervision of the construction work, though that is let out to contractors.

Money for this road work was provided by a million dollar bond issue and about \$850,000 will be used in this system of road building, the balance being held for emergencies or used in constructing roads.

Most of the mileage of the new roads was a base the old roads of the graded and graveled type of which there were many miles in this county. They were and are good roads for traffic that is not excessively heavy. Using that as the base the surface was scarified where the road bed did not have to be graded up or down as the case might be, for 5% was fixed as the maximum grade, and that added much to the value of the roads for it provided an excellent foundation. Therefore the total mileage of entirely new road building is not a very considerable part of the total 133 miles of new roads in the cardinal and subcardinal road system, as the Travilla roads are styled. All reverse or "S" curves were eliminated and sharp turns or corners cut off. Alignment was bettered by straightening and small cutoffs, where that was necessary, or practicable.

On the foundation, as stated above, the new macadam road was built. That was entirely of hard stone of graded sizes, rolled until compacted, the upper layers being treated with refined tar and the finishing being done with the hardest stone and heated asphalt applied under pressure so that a penetration of 75 is secured.

On that is scattered hard stone screenings, to prevent slipping and to make a hard wearing surface, this latter application being made while the asphalt is hot or before it has a chance to set, anyway.

Temperatures below freezing, some as low as 20 degrees last winter did not injuriously affect these roads. The influence of the summer heats is to be tested, as it will be this summer.

But the recent excessive rains have subjected the roads to another and unexpected test, through the

flooding of the road beds, in some instances currents running over them strongly—not torrential—but strong currents of water all the same.

After the waters had run off a careful examination was made of the condition of the roads by County Engineer Hays and Consulting Engineer Travilla. Their report says: "Tarrant county's \$1,000,000 highways have recently been subjected to the severest test of nature and they have satisfactorily demonstrated their immunity from damage from rains, floods and currents. Some stood under water for hours and some were subjected to strong currents of water. All came through the test in perfect condition."

During the Texas State Bankers Convention in Fort Worth in May one of the attendants, making an address, was W. G. Edens of Chicago, assistant secretary of the Central Trust Company of Illinois. He is also president of the Illinois Highway association and of the associated road organizations of Chicago and Cook county and is a leader in other road organizations, so his opinion is that of one who has given much and close study to the good roads problem. He thinks the Tarrant county type of road could be used to advantage in Illinois. In an interview, printed in the Chicago Banker, he makes this statement: "During the hard rains that recently prevailed these roads (the macadam with asphalt surface) withstood an overflow of water, apparently without any damage. The roads were inspected by the county superintendent of roads, I accompanying him, a few days after the rains. I was greatly impressed with the progress being made by the people of Texas in the matter of road improvement. In Tarrant county I had the opportunity of inspecting roads of the macadam type with asphalt surface and they seem to be satisfactory in everyway, to the users of roads in that section."

Since the report has been printed county commissioners and engineers from other parts of the state have come here for an inspection of the Tarrant county road system and that they might have the chance for a first hand study of the Tarrant county paved or hard surfaced roads, and their condition after the test of the excessive rainfall of May, a rainfall that made a new record for that month in this part of the state, the Weather Bureau report showing a total of 10.71 inches with a 4.15 inches normal.

Fort Worth and Tarrant county have been pioneers in many things for the general welfare of the state of



Asphalt bound macadam on the Fort Worth-Dallas road, Tarrant county, Texas.

Texas. If it shall prove that its type of roads, is frost proof, flood water proof and after the summer heat test, sun heat proof, then that often misapplied word "Ideal" can be used in descriptions of these roads.

Working on the Lincoln Highway.

An organization has been formed in Northern California known as the Feather River Federation. Its purpose is to interest the counties of Northern California, and the state highway authorities in the construction of an improved road from Feather river canyon, which will be one of the main arteries of traffic leading to and connecting with the Lincoln Highway, and a road which will allow of easy and quick communication with the Lincoln Highway from every part of Northern California.

The counties included in the organization are Butte, Yuba, Plumas and Lassen. It is planned to obtain \$2,000,000 through state aid and county bonds for the purpose of building this road, the intention being to mark it with a distinctive sign indicating the fact that it joins the Lincoln Highway.

This is the canyon through which the Western Pacific, the western extension of the Gould system, enters California, and it is considered one of the most beautiful mountain canyons in America.

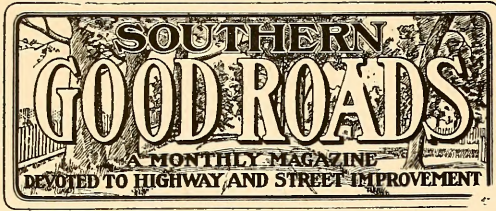
The Lincoln Highway Association has just issued from its national headquarters an official tourist guide, which not only shows the exact route of the Lincoln Highway, but the improved main connecting roads from every section as well. The map is printed on a heavy map cloth and folds into small space so that it can be easily slipped into the inside pocket of the coat.

Construction work is now progressing on the four mile and a half section of the Lincoln Highway which Allen county, Ind., is building between Fort Wayne and New Haven, and it is expected that the work will be completed by November 1st. The subgrade is now completed for a distance of four miles and the concrete is being rapidly laid, several hundred feet are already finished.

The road, which will form an important link in the Lincoln Highway, is sixteen feet wide, of solid concrete, with four-foot dirt shoulders on each side. All construction is under the supervision of the county surveyor and the Fort Wayne consul of the Lincoln Highway Association. William M. Griffin, who is also president of the Fort Wayne commercial club, and to whose efforts much of the credit for the securing of this fine stretch of modern highway must be given.

The section of the Lincoln Highway will cost the county about \$60,000.

A Colorado rancher has contributed to the Lincoln highway a straight right-of-way across his land, sixty feet wide and nearly four miles in length. St. Joseph county, Indiana, has just passed a special bond issue for \$193,000 to be used in improving its section of the highway. Five counties in Iowa have appropriated \$140,000 for Lincoln highway improvement this year, and so it goes. These are simply instances showing the kind of feeling the Lincoln highway has aroused; every one is helping, every one is doing his part to make the highway a wonderful reality. To give a full account of what has been accomplished in even the last five months along the 3,400 miles of the highway would require a volume,



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AMERICAN ROAD CONGRESS.

As this issue of Southern Good Roads goes to press the road-builders of the nation are assembled in Atlanta for the greatest road gathering in the history of the South. Great preparations have been made by the city of Atlanta and it is certain that the delegates are getting a taste of genuine Southern hospitality.

We are glad that the congress came south. It is the first great national road gathering to be held as far south as Atlanta and it will do untold good. Southern newspapers have devoted many columns to exploiting the meeting and they are now using as much space as the big war in Europe will permit, to tell the world of the doings of the convention.

Speakers of national reputation are in attendance. European representatives are not there. At previous congresses France, the leading road-building nation of the world, was represented. Her road engineers are "with the colors" now and few are available for spreading the good roads gospel in foreign lands.

In behalf of the South, our field, we desire to express our appreciation of the high honor that has been paid us in the holding of this great national congress in the South and to invite the organizations back of it, the American Highway Association, the American Automobile Association, and allied bodies, to come again. The South has demonstrated her ability to take care of

the congress and there are half a dozen other Southern cities that could entertain the congress almost, if not quite, as well as Atlanta.

THE BRISTOL CONVENTION.

The Bristol convention of the Southern Appalachian Good Roads Association last month was a great success from every standpoint. The attendance was large, every state in the association being well represented, and great interest was shown in the daily proceedings.

The speeches were good. There were no dry-as-dust, long-winded speeches. Every address was right to the point, bright and snappy, full of meat for road-builders who were hungry for just such material as these addresses furnished. The discussions following the formal papers were good, in every instance.

The convention re-elected Dr. Joseph Hyde Pratt president. Dr. Pratt has served acceptably since the organization of the association. He it was who started the movement that resulted in the organization and he has been the dynamo of the organization all the way.

The convention was wise in its choice of a secretary. Mr. C. B. Scott, of Richmond, Va., assistant state highway commissioner of Virginia, is well known to readers of Southern Good Roads throughout the South. He has been a frequent contributor to our columns and ranks as one of the livest good roads men of the entire South.

The convention meets next year in the live town of Bluefield, W. Va., and a good convention is in prospect. Bristol's hospitality was all that could be asked for and a great deal more. Hon. W. I. Lee, county highway engineer of Princeton county, in which Bluefield is situated, promises that Bluefield will come up to the mark set by Bristol, and to use an expressive bit of slang, that will be "going some."

A BRIEF FOR NATIONAL HIGHWAYS.

At the request of the Good Roads Committee of the House of Representatives Judge J. M. Lowe, of Kansas City, Mo., has submitted a brief of his arguments in favor of a system of National Highways and against a policy of "Federal Aid" to the states for road building. Judge Lowe, who is president of the National Old Trails Road Department of the National Highways Association is one of the most prominent men in the good roads movement in this country.

In his brief he says:

As "Federal Aid" in some form is being agitated as preferable to a system of National Highways, permit me to ask why make the states contribute an equal amount or any other amount as a condition precedent to any action by the general government?

Why make the state contribute to a national enterprise at all?

If a road is not of national concern ought the national revenues to be appropriated to it?

If it is of national concern ought the state to contribute?

But you may say that it will be of benefit to the state. Granted, but shall the government refuse to enter upon an internal improvement for fear it will benefit the state?

Shall the state be taxed because she is benefitted by such improvement?

If this is to be the policy, then why not apply it to rivers and harbors? They, too, are of local benefit. And to public buildings, and many other public enterprises?

Besides, is it not illogical and impracticable to give or try to give joint authority and supervision to the states over a national highway or over any highway? The supreme court has repeatedly said that there is no difference between a highway on the land and on the water. What would be the result if every state through which a navigable stream may run had jurisdiction and control over it? There would be no uniformity in its upkeep or in the navigation laws governing its use.

Joint control and supervision is impracticable and unworkable. Either the state or the general government must be supreme. If each is supreme over its own system and only over its own system there will be no friction, no departure from the uniform practice of the government, no questions of state right, or of paternal or concentrated federal power, no conflict of authority, no dodging of responsibility.

And, after all is said, why tax the state or the people of the state before permitting them to have any benefit from taxes already paid? For, twist the whole matter as we may, it all comes back to the ultimate fact that "the people pay the freight," whether it comes out of the national treasury or a part of it out of the state treasury.

President Harrison, of the Southern, on Good Roads.

Regarding public roads as an indispensable part of the transportation system of the country, supplementing its railroad and waterways, President Harrison, of the Southern Railway Company, takes an active interest in the good roads movement. He is vice-president of the American Highway Association, and will be one of the speakers at the fourth American road congress in Atlanta in the week of November 9.

Speaking of the relation of the country highway to the railroad, Mr. Harrison said: "Whatever may be the final destination of the farm products, their first movement must be over the country road and if the farmer is to receive the largest measure of benefit from good roads the policy should be adopted of improving those highways which radiate from market towns and shipping stations and over which the farmers must haul their products. The profit which will be earned by the farmer may depend largely upon the condition of the road from his farm to a shipping station.

"Statistics compiled by the department of agriculture show that the cost of hauling farm products to shipping points over bad roads is a disproportionately large part of the total expense of their transportation to market. This is not always fully realized by the farmer, but if he will take into account the time of himself and his team and the wear and tear on his ve-

hicle and harness, made necessary by a larger number of trips with smaller loads, he will find that the cost amounts up very fast and correspondingly reduces his net profits.

"The manifold advantages of an improved highway in reducing the cost of drayage, facilitating social intercourse, promoting school and church attendance, expediting rural mail delivery, increasing the value of farm lands and promoting agricultural development back from the railroads are so great that they need but to be enumerated to present convincing argument in favor of road improvement.

"Since several years ago, when the Southern Railway Company, in conjunction with the agricultural department and state and local authorities, operated over its lines a good roads train, carrying machinery and lecturers and building at central points object-lesson roads, there has been very substantial progress in the good roads movement throughout the south. This was accelerated in 1911 by the operation of another good roads train in co-operation with the United States department of agriculture and the American Highway Association. The interest of the southern people in good roads has been thoroughly aroused, and in many localities the country highways have been highly improved and are being adequately maintained.

"I think it is fortunate for the south that the American road congress of 1914 is to be held in Atlanta. This will unquestionably be one of the most important gatherings ever held in the southern states. It will bring together the official heads of the state highway departments, the foremost experts in road construction and maintenance, and other leaders in the good roads movement in each state for an exchange of ideas as to the best methods of financing road construction and building and maintaining the best types of country highways."

\$14,000,000 Per Year in Indiana.

Mr. C. A. Kenyon, president of the Indiana Good Roads Association and vice-president of the National Old Trails Association, says that his state is spending about \$14,000,000 annually on its roads. Concerning the good road law of his state he says:

"By special enactment, each township can, on petition of fifty taxpayers, issue bonds for the original construction of roads. A comparatively recent ruling by the United States Postoffice Department aids us greatly. By that rule a road overseer is allowed to ride on the wagons of the rural carriers. Indiana is going to the front with its highways. We consider roads our best investment there."

Mr. Kenyon stated that the mileposts and signs for the National Old Trails Road Association are being erected by the Automobile club of Southern California, and that two motor trucks are working out of Los Angeles placing them. That club has undertaken to place a sign at each mile of the highway between Los Angeles and Kansas City. The work will be completed in time for the motorists who desire to make the trip to the exposition.

Hawkin county, Tenn., has decided to construct a bridge across the Tennessee river near Buren, to cost \$18,000. It will be 1400 feet long. Mr. J. N. Ambler, of Winston-Salem, N. C., is engineer.

The commissioners of Lampasas county, Tex., have contracted for four bridges, all of steel and iron construction. They will cost about \$14,000.

Proceedings of the Southern Appalachian Good Roads Convention

By MISS H. M. BERRY

Assistant Secretary, Chapel Hill, N. C.

The Sixth Annual Convention of the Southern Appalachian Good Roads Association was called to order by the president on the evening of October the sixth, in the auditorium of the Hotel Bristol. The convention was opened with prayer by the Reverend Doctor Kistler, of the Presbyterian church, Bristol, Va. The convention opening was most auspicious with a large attendance of delegates and visitors, and the president began the convention by reading a telegram from our Nation's President, Woodrow Wilson, as follows:

"The White House,
Washington, D. C.,
October 5, 1914.

Mr. Henry R. Roberts, Chairman,
Committee on Arrangements,

Southern Appalachian Good Roads Association, Bristol, Virginia-Tennessee.

Please convey to the members of the Sixth Annual Convention of the Southern Appalachian Good Roads Association my best wishes for a successful annual meeting. I hope that the efforts of the association may result not only in the building of better roads throughout the Southern Appalachian region, but in better road management and better road maintenance.

(Signed) WOODROW WILSON."

With his usual happy faculty of coming to the point of any situation, the president struck the keynote of the convention in the closing words of his telegram, i. e., "Better road Management and better road Maintenance." These two subjects were taken up and discussed in great detail by the convention, as it was realized by all present that the prime need of each of the eight states composing this association is a well equipped State Highway Department, and that the organization and equipment of maintenance forces is of first importance, if the roads built are to give the greatest durability and efficiency.

Short addresses of welcome were made by Mayor George M. Warren, for Bristol, Virginia; Honorable John H. Caldwell, for Bristol, Tennessee; Honorable Carl A. Jones, for the Bristol Board of Trade; Honorable C. B. Scott, of Richmond, for the State of Virginia, and Honorable John I. Cox, for the state of Tennessee. These speakers extended to the visitors a cordial welcome and spoke briefly of the great necessity for good roads in their sections and what they hoped would be accomplished through the work of this association and the holding of this Sixth Annual Convention in Bristol.

Responses of five minutes each, were then made by: Mr. Joseph Hyde Pratt, president of the association, who expressed his appreciation, on the part of the members of the association, for the very cordial welcome extended to them and to the delegates to this convention. Mr. Pratt then reviewed briefly the object of the association and what has been accomplished since its organization. He stated that this organization was effected because it was felt that the states included in it are closely bound together in their road problems, not only because of the similarity in general topography of the states of this region, but because of their great possibilities to interest a tourist trade. He stated

that it is now felt that in order to secure the best development of the great natural resources of the Southern Appalachian Region, the building of good roads leading not only from one county to another, but, from one state to another and from this section to all other sections of our nation, is the first essential.

Others who gave responses were:

Hon. Lee F. Miller—For Motor Parties, from East Tennessee.

Hon. E. J. Prescott—For Motor Parties, from Coal Fields.

Hon. E. S. Finney—For Motor Parties, from Clinch Valley.

Hon. Robert Pennington—For Motor Parties, from Virginia.

Hon. W. I. Lee—For West Virginia.

Dr. M. H. Fletcher—For North Carolina.

Following these reports, Mr. Pratt, as president of the association, made a brief report showing work which had been accomplished throughout this general region during the fiscal year of the association.

On Wednesday, October the seventh, the morning session was begun by reports from representatives of various counties in this region. The counties reported on are given below:

Sullivan County—Tennessee—Hon. John I. Cox.

Washington County—Virginia—Mr. M. Roberts.

Carter County—Tennessee—Dr. Hunter.

Scott County—Virginia—Rev. Isaac Byrd.

Lee County—Virginia—Hon. C. T. Duncan.

Wythe County—Virginia—Dr. W. H. Ribble.

Dickenson County—Virginia—Mr. Columbus Phipps.

Roanoke County—Virginia—Mr. J. H. Marsteller.

Mercer County—West Virginia—Mr. W. I. Lee, Road Engineer.

Buncombe County—North Carolina—Dr. M. H. Fletcher.

McDowell County—West Virginia—Mr. McClaren.

Whitley County—Kentucky—Mr. J. M. Ellison.

Dixon County—Tennessee—Mr. J. B. Weems.

Cherokee County—South Carolina—Mr. E. F. Lipscomb.

Hamblen County—Tennessee—Mr. J. N. Fisher.

Knox County—Tennessee—Mr. R. O. Gallaher.

Russell County—Virginia—Mr. E. S. Finney.

Wise County—Virginia—Mr. E. J. Prescott.

Madison County—North Carolina—Mr. Joseph Hyde Pratt.

Avery County—North Carolina—Mr. Lee F. Miller.

Watauga County—North Carolina—Mr. C. D. Taylor.

Henderson County—North Carolina—Mr. Joseph Hyde Pratt.

Hamilton County—Tennessee—Mr. A. N. Sloan.

The reports from these various counties were most interesting, showing the great effort which is now being made in many of them to bring about better conditions in the administration of their road funds, construction of their roads and maintenance of these roads after they are built. Wise and Russell counties, Virginia, had excellent exhibits, pictures and maps, showing the work which had been done on their roads. An

exhibit was also made by the North Carolina Geological and Economic Survey of roads in the Southern Appalachian Region in North Carolina and a road map of Western North Carolina. One of the most noticeable features of this exhibit was the splendid set of photographs showing the roads of Buncombe county, which were contributed to this exhibit by Mr. N. Buckner, secretary of Board of Trade of Asheville, and the Asheville and Buncombe County Good Roads Association.

The afternoon session was begun by the reading of a paper on "Road Maintenance," written by Major W. W. Crosby, civil engineer, of Baltimore, and formerly Highway Commissioner of Maryland. This paper met with a ready response and Mr. Crosby's treatment of it was most informing. Much discussion followed the reading of the paper which it is believed will result in a greater effort being made on the part of road engineers and road enthusiasts to secure a proper system of maintenance for their counties.

The next address was by Hon. G. P. Coleman, State Highway Commissioner, of Virginia, on the "Value of the State Highway Commission." As the majority of the states included in this association are without State Highway Department, this address was of much interest and value, as it is now being realized that without such a head of the highway work of a state much money is wasted and the work conducted in a more or less unsystematic unsatisfactory and desultory way.

Hon. A. G. Batchelder, of the American Automobile Association, spoke next on "Taxing the Vehicles that Use the Roads." Mr. Batchelder, who has attended a number of other conventions of this association, was welcomed not only as a guest but as a co-worker, and, as usual, spoke with great enthusiasm bringing a plea for the proper use of the automobile tax and the extension of this tax to other vehicles.

Professor S. P. Slack, of the University of Georgia, spoke on "County Bridge Lettings." He, too, showed the necessity for a central road authority in each state, which could issue standard specifications for bridges, inspect the bridges as they are being built, and accept them for the counties, thus eliminating much wastage in bridge building throughout this region.

Hon. George E. Cassel, publicity agent, Norfolk and Western Railway Company, spoke on "Where to Build Roads and What to do With Them After They Are Built." This, of course, involved the question of proper locations and the great subject of maintenance. These topics were discussed with much enthusiasm by the delegates at the end of each address.

The president then announced the appointment of the following committees:

Nominations and Next Meeting Place—Mr. C. B. Scott, Chairman, Virginia; Mr. W. W. Duffield, Kentucky; Dr. M. H. Fletcher, North Carolina; Mr. C. P. Light, District of Columbia; Mr. W. I. Lee, West Virginia.

Resolutions Committee—Mr. W. I. Lee, Chairman, West Virginia; Mr. J. W. Lynch, West Virginia; Mr. E. P. Dunlap, Tennessee; Prof. S. P. Slack, Georgia; Mr. A. H. Pettigrew, Virginia; Mr. John W. Fleniken, Tenn.; Capt. Sam Webb, North Carolina; Mr. James Maret, Kentucky; Mr. Arch B. Calvert, South Carolina.

Publicity Committee—Mr. Henry Roberts, Chairman, Virginia; Mr. J. H. Marsteller, Virginia; Mr. C. P. Light, District Columbia; Mr. J. H. Slaughter, North Carolina; Mr. Charles Williams, Virginia; Mr. Cyrus Kehr, Tennessee; Mr. W. E. Wolfe, Tennessee; Mr. Guy V. Roberts, N. Carolina; Mr. D. W. Hughes, South Carolina; Mr. W. B. Hodgkin, Kentucky; Mr. J. H. Harmon, West Virginia.

Committee on Construction Progress—Mr. Henry Robert, Chairman, Bristol, Virginia; Dr. M. H. Fletcher, Asheville, North Carolina; Mr. E. F. Lipscomb, Gaffney, South Carolina; Prof. S. P. Slack, Athens, Georgia; Mr. W. I. Lee, Princeston, West Virginia; Mr. E. S. Finney, Lebanon, Virginia; Mr. E. J. Prescott, Big Stone Gap, Virginia; Mr. J. E. Susong, Bridgeport, Tennessee; Captain Sam Webb, Mebane, R. F. D., North Carolina; Mr. J. M. Ellison, Williamsburg, Kentucky; Mr. C. P. Light, Washington, D. C.

The delegates were entertained by the Bristol Board of Trade at a motion picture theatre party on the evening of the seventh. In addition to the regular program, a film was furnished by Mr. L. T. Nichols, general manager of the Carolina and Northwestern Railway Company, which gave scenes the line of this road and also some roads of Western North Carolina in the Linville section, etc.

On Thursday, October the eighth, the convention was addressed by Hon. Sam R. Sells, Congressman from Tennessee, on "Road Building in the Appalachian Parks." Mr. Sells' address was very able and was listened to with great interest by the delegates.

Another interesting talk was made by Hon. H. G. Peters, of Bristol, on "Co-operative Road Building," which was followed by an address by Hon. Cyrus Kehr, of Tennessee, on "Landscape Designing as Related to Public Road Building." Mr. Kehr presented some more ideas which provoked more talk and interest among those present.

Hon. C. B. Scott, of the Virginia Highway Commission, made a brief report of the Virginia Road Builders' Association.

Mr. Charles P. Light, of the American Highway Association, explained in detail the work of his association and what it proposes to be able to give to those delegates attending the Atlanta Road Congress in November. This is the first time such a large congress has been held in the South, and Mr. Light did much to interest those present in the possibilities of this Congress for furthering the good roads work in the South.

On Thursday, October the eighth, Mr. Joseph Hyde Pratt, State Geologist of North Carolina, made a talk on "Convict Labor on Road Construction," which was followed by Reports on Special Highways passing through this general section, as follows:

Asheville-Greenville, Knoxville-Asheville, Charlotte-Asheville, Atlanta-Murphy-Asheville, Central Highway of North Carolina, Knoxville-Cumberland Gap-Cincinnati, Knoxville-Atlanta, Hendersonville-Spartanburg, Crest-of-the-Blue-Ridge, Bristol-Charlotte, Bristol-Knoxville, Bristol-Memphis, Bristol-Lexington, and Boone Way, Bristol-Coal Fields, Bristol-Bluefield-Pittsburgh, Bristol-Norfolk, Bristol-Washington.

On Thursday evening Mr. Will Ward Duffield, representing the National Highways Association, addressed the convention on the work of this association and extended an invitation to the Southern Appalachian Good Roads Association to become affiliated with the National Highways Association.

This was followed by a report of the committee on the nomination of officers, as follows:

Mr. Joseph Hyde Pratt, Chapel Hill, North Carolina—President.

Mr. Henry R. Roberts, Bristol, Virginia—Vice-president-at-large.

Mr. C. B. Scott, Richmond, Virginia—Secretary.

Miss H. M. Berry, Chapel Hill, N. C.—Assistant Secretary.

State Vice-Presidents—Georgia, W. A. Hansell; Tennessee, J. N. Fisher; North Carolina, Captain S. H.

Webb; Virginia, E. S. Finney; Kentucky, James Maret; South Carolina, E. F. Lipscomb; Alabama, John Craft; West Virginia, W. I. Lee.

Executive Committee—West Virginia, A. D. Williams; Georgia, C. M. Strahan; Tennessee, W. E. Myer; North Carolina, H. B. Varner; District of Columbia, C. P. Light; Virginia, George P. Coleman; North Carolina, Dr. M. H. Fletcher; Kentucky, W. W. Duffield; Georgia, W. T. Winn; South Carolina, W. G. Sirrine; Alabama, W. S. Keller; Virginia, W. F. Coker; West Virginia, W. J. McClaren.

Next meeting place, Bluefield, W. Va.

Signed:

C. B. Scott, Chairman, Virginia.

W. W. Duffield, Kentucky.

Dr. M. H. Fletcher, North Carolina.

C. P. Light, Washington, D. C.

W. I. Lee, West Virginia.

Committee on nominations and next meeting place.

Those nominated were unanimously elected.

Report of Committee on Resolutions—

Whereas, the National Forest Reservation Commission under authority of the Weeks law has purchased large areas of land in the White Mountains and Southern Appalachian Mountains and has proposed for purchase still larger areas.

Now, therefore, we, the Southern Appalachian Good Roads Association, as showing our interest in this work of national conservation, favor and recommend that the Congress of the United States make such additional appropriation as may be necessary to enable the National Forest Preservation Committee to purchase these additional areas under the Weeks law.

Resolved, further, that in order to give the people the full use of these public lands for recreation and pleasure, we favor the construction by the government of a system of highways through these national forests, to be laid out with the view of the states and counties constructing the connecting links, and that we petition congress to make an appropriation for this purpose, believing it to be the duty of the government to develop this important part of the natural resources of these mountain regions.

Resolved, that a copy of this resolution be sent to the president, to the senators from this state, the members of Congress from this district, to the National Forest Reservation Commission, Washington, D. C., and to Appalachian Park Association, Asheville, N. C.

Resolved, that "The Southern Appalachian Good Roads Association," in view of the invitation extended to this association by the board of Councillors of the National Highway Association to become federated with them in the Good Roads Work, and in recognition of such invitation, therefore, be it resolved: That this matter be referred to the executive committee of this association to meet and confer with the committee of the National Highway Association, to discuss fully details of such federation.

Be it further resolved that the executive committee of this association be herewith authorized and empowered to take such action as they may deem best in regard to the above invitation, looking to the advancement of the Good Roads Movement throughout the nation.

Resolved, that the states embraced in the Southern Appalachian region should apply the funds derived from the registration fee or license tax on all motor driven vehicles entirely to the maintenance of improved roads.

Resolved, that the Southern Appalachian Good Roads Association request the county authorities of the respective counties of the states participating in this

convention to attend and have on display pictures and road exhibits at the Fourth American Road Congress, to be held in Atlanta, Georgia, on November the ninth, 1914.

Resolved, that Mr. Henry Roberts, Chairman of Committee on arrangements for this meeting, be extended the thanks of this association for his untiring efforts in making this the most successful convention in the history of the association.

Resolved, that this association extend to the Bristol Board of Trade, the Hotel Bristol, and the Bristol Herald Courier and the press of the states of this territory, its hearty appreciation for the courtesies and assistance rendered in making this, the Sixth Annual Meeting, uniformly successful.

Resolved, that the Southern Appalachian Good Roads Association extend to the officials of the respective railways its hearty appreciation for the courtesies and assistance rendered by them.

W. I. Lee, Chairman, West Virginia; E. P. Dunlap, Tennessee; Capt. Sam Webb, North Carolina; A. H. Pettigrew, Virginia; Arch B. Calvert, South Carolina; W. E. Myer, Tennessee; J. W. Lynch, West Virginia; Prof. S. P. Slack, Georgia; James Maret, Kentucky.

Committee on Resolutions.

The resolutions were adopted as read.

The following resolution was referred to the executive committee:

Resolved, That this convention appoint a committee from the states comprising this association, each state having representation, whose duty it shall be to investigate the statutory road laws of their respective states, find the defects of said laws, and make such recommendations tending to eradicate these defects, and recommend such amendments to their respective legislatures as to them seem proper and expedient, or, in their discretion, make a concerted recommendation with such minor exceptions as local conditions would demand. Said committee to be appointed by the president of this association for a term of two years.

Report of Committee on Construction Progress:

Your Committee on Construction Progress recommends that the efforts of the association for the next year be directed toward the completion or improvement of the following highways, or sections of highways, viz:

1. From Newport, Coker county, Tennessee, to the improved road in Madison county, N. C., at the state line.
2. The Asheville-Murphy-Atlanta Highway.
3. The Crest of the Blue Ridge Highway.
4. From Linville via Newland through Avery county, N. C., and Carter county, Tennessee, to Elizabethton, Tennessee.
5. From Boone, Watauga county, N. C., to Mountain City and Shady to the South Bridge in Sullivan county, Tennessee.
6. From Mountain City, Tennessee, to Damascus, Virginia.
7. The macadamizing of short sections of the Bristol-Memphis Highway in Sullivan, Washington and Greene counties, and the grading and draining and macadamizing of about eight miles between Jonesboro, in Washington county, Tennessee, to the Greene county line.
8. The macadamizing of the Bristol-Knoxville Highway, particularly through Hawkins and Grainger counties, and portions of Sullivan and Knox counties.
9. The completion of the unfinished sections of the Bristol-Washington and Bristol-Norfolk Highways between Bristol and Roanoke.
10. The grading and draining of the section of the

Bristol-Coal Fields Highway from Tumbez, in Russell county, to Mendota, in Washington county, and thence to a connection with the Bristol-Lexington Highway near Early Grove, in Scott county, Virginia.

11. The macadamizing of the roads from Wise and Norton to Coeburn and St. Paul.

12. The grading and draining, and macadamizing so far as practical, of the Bristol-Lexington Highway from Bristol to Cumberland Gap, with perhaps two or more routes between Natural Tunnel and Jonesville—one route to go via Big Stone Gap.

13. The improvement of as much as possible of the Bristol-Lexington Highway between Middlesboro and Crab Orchard.

14. The improvement of the road from Pennington Gap to Dryden in Lee county, Virginia, and from Bolton to Hansonville, in Russell county, Virginia.

15. The completion of the Bristol-Bluefield Highway, so that delegates attending the 1915 annual convention at Bluefield from the sections south and west of Bristol may motor to the convention over a finished highway.

16. We further recommend that the chairman of this committee be authorized to appoint sub-committees in the various counties and sections to assist in carrying out the work outlined in this report.

17. Respectfully Submitted—

Henry Roberts, Chairman, Bristol, Virginia; Dr. M. H. Fletcher, Asheville, North Carolina; Mr. E. F. Lipscomb, Gaffney, South Carolina; Prof. S. B. Slack, Athens, Georgia; Mr. W. I. Lee, Princeton, West Virginia; Mr. E. S. Finney, Lebanon, Virginia; Mr. E. J.

Prescott, Big Stone Gap Virginia; Mr. John B. Susong, Bridgeport, Tennessee; Capt. Sam Webb, Mebane, R. F. D., N. C.; Mr. Lee F. Miller, Elizabethton, Tenn.; Mr. J. M. Ellison, Williamsburg, Ky.; Mr. C. P. Light, Washington, D. C.

18. We further recommend that the chairman of this committee be authorized to appoint a special committee to be charged with the duty of arranging for the purchase of the Natural Tunnel, and several hundred acres of land around same, to be known as the Natural Tunnel Park, and to be owned and developed by Scott county, Virginia, but if Scott county should fail to take advantage of this great opportunity, then the special committee should organize an association of leading men of Scott county and of this section to acquire and develop this property.

On the afternoon of the eighth the delegates to the convention witnessed a demonstration of scarifying and repairing some macadam road in Bristol under the supervision of S. G. Keller, Jr., Commissioner of Streets and Public Property, Bristol, Tennessee. This demonstration was of great interest to the delegates.

About four hundred delegates registered at this convention from the following states:

Virginia, Tennessee, West Virginia, North Carolina, South Carolina, Kentucky, Georgia, Ohio, Missouri, Texas, Maryland, and District of Columbia.

In conclusion too much credit cannot be given to Mr. Henry Roberts, chairman of the Good Roads Committee of the Bristol Board of Trade for his untiring efforts and efficient management in arranging for this convention.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Alabama.

The Birmingham Age-Herald says that this has been Alabama's banner year in good road making. Counties that had done little in the improvement of their highways have waked up. During the summer just past the work of building modern roads has been pushed and it will continue right up to the end of December.

No matter how dull the securities market may have been the demand for road bonds at par has not flagged. There is not a county in the state that cannot afford to spend money on its highways. The fact is that no county and magisterial district bonds. Up to the county can afford to be without good roads. The day of the old mud road is fast passing. Farm lands in Alabama are steadily enhancing in value, and in counties where the macadam road is much in evidence values have doubled within the last few years.

At the rate at which road builders are now at work it will not be long before farms in the backwoods of Alabama will be worth intrinsically from 50 to 100 per cent more than they are today.

* * *

Georgia.

Distribution among the counties of the state of Georgia of \$94,000, derived from the sale of automobile licenses, to be used for highway improvements, will begin as soon as the state treasurer hears from Echols county in regard to its rural route mileage.

The money is now in the state treasury. It will be

divided according to the amount of rural route mileage in each county. Up to the first of November, letters had been received from every county giving the amount of the mileage, save two—Bartow and Echols. Bartow has since been heard from.

The county commissioners of Echols have failed to answer inquiries regarding the mileage, but the ordinary of Echols, with whom the matter was taken up, has written that he will get that information from the commissioners and notify the treasury department, so that all the counties in the state can get the money at once.

* * *

Mississippi.

A conference of the Mississippi delegates to the meeting of the American Highway Association at Atlanta was held at Jackson, Miss., Nov. 9, for the purpose of forming a state highway association.

Mr. D. J. Morrison, of Jackson, who headed the delegation to Atlanta, was chosen chairman of the meeting. There was a good attendance of the delegates, and a number who could not come in person sent proxies. A few days before Governor Brewer named forty delegates to attend the Atlanta convention, and more than a majority of these attended.

The Mississippi Highway Association, launched at this meeting, is to conduct a systematic campaign for the building of good roads in the commonwealth, and one of its first efforts will be to secure the passage of

a law at the next legislative session creating a state highway commission, authorized to employ competent engineers, and to secure uniformity in road construction.

A campaign of education will be waged on this subject, and the question put directly before candidates for the legislature next year.

It is estimated that during the past four years the various counties in Mississippi have spent between six and seven million dollars for permanent highway improvement. Some of this money was no doubt virtually wasted because of lack of knowledge of road construction. The Mississippi Highway Association will make an effort to see that for every dollar expended on roads the tax payers get one hundred cents in value.

Mr. D. J. Morrison, who presided as the meeting, is one of the foremost good roads enthusiasts in the state.

* * *

Missouri.

What was declared to be the best good roads meeting ever held in southwest Missouri assembled at Springfield, Mo., October 6th under the name of the Inter-Ozark Highway Association. There were delegates present from 11 counties of the Ozark section. The delegates were guests of the Greater Springfield committee and were entertained royally during their stay in Springfield.

When the meeting was called to order by John T. Woodruff, chairman of the Greater Springfield committee, at the assembly hall of the Springfield club, every seat in the spacious room was taken and it was necessary to bring in additional seats to accommodate the big crowd. Instead of being represented by part of their regular delegations, many counties had doubled the number of good roads delegates.

In opening the meeting Mr. Woodruff discussed briefly the purposes of the convention and explained that it was not a formal association and that none was contemplated. The good road builders had been called together to work out plans for district work.

Mr. Woodruff explained the organization of the Greater Springfield committee and mentioned the fact that one of its first efforts resulted in the establishment of the Eight Mile Special Road district, of which Springfield is the center. He suggested that this plan was feasible only for cities and counties in which the income from the district would be sufficient to do good road building. It was estimated that the Springfield road commission would receive approximately \$75,000 annually for road and bridge work.

"I understand from members of the commission," Mr. Woodruff said, "that it is proposed to use this fund largely to secure co-operation in road building. The money will not be used without the aid and co-operation of property owners who live along the roads that are to be improved. It is to be a sort of bonus for good road development."

Mr. Woodruff stated that he had been informed by the Springfield commission that the services of their highway attorney and engineer were at the disposal at cost of any of the counties in the Inter-Ozark Highway district, in planning either for eight-mile districts or special road benefit districts. The special assessment districts in which bonds are issued for road work were advocated by Mr. Woodruff for the country districts. It was suggested that districts two miles wide be formed in every county of the Ozark territory along the lines of the proposed trunk highway. The road work will cost, according to expert estimates, between \$1,000 and \$1,500 per mile.

New York.

The State Automobile Association of New York has just completed a noteworthy five weeks' official tour that traversed 3,000 miles of state and county highway, covering every county. The object was to increase membership in the association, now nearly 20,000, and stir up interest in good roads everywhere. Enthusiastic crowds greeted the traveling autoists at all points. President A. J. Deer, of Hornell, had charge of the expedition, and John McGlynn of Troy, president of the New York State Hotel Men's association, went along to help rub in the association's slogan of "See New York State First."

President Deer urged the people to get back of the highway department and give it their most active assistance in the great work it is doing.

"As president of the association," said Mr. Deer in his speeches, "it became my duty and that of our other officials to make a most rigid investigation of the personnel of the highway department when Mr. Carlisle got control. We had the benefit of the counsel of eminent engineers. We went into this matter deeply and have followed every step of the department's work and kept a keenly open eye for every mile of new road constructed.

"Gentlemen, I am here to tell you, and I am of the political faith opposite to that of Mr. Carlisle, that our association has assured itself that under present administration politics has been eliminated entirely from the highway department and that it is being administered on the maximum plane of efficiency. It is up to us and it is up to you to keep politics out—just as much as to keep it out of our own association. For that reason every one of us has a duty as a citizen to back up the highway department squarely, and if any man or any party dares to attempt disturbing present conditions so as to make the state highway department a football of politics and restore those abominable influences and conditions that once threatened to destroy it as the most important of our state institutions, he will have to deal with our association as a whole, regardless of the individual political predilections of its individual members."

* * *

Texas.

With three of the roads completed, two others about complete and work on the remaining three well advanced, with all grading and rock work done, indications are that the million-dollar system of good roads for Tarrant county, Texas, will have been turned over to the commissioners by the last of the year, says the Fort Worth Record.

Consulting Engineer Travilla, under whose supervision the roads are being constructed; County Commissioner Durringer; W. G. Turner, chairman of the Chamber of Commerce good roads committee, and others made a trip over three of the roads recently and all concerned expressed satisfaction over the progress of the work.

The road to the Parker county line, known as the Weatherford road, has been completed for some time, as have those to Azle and Keller. The first is sixteen, the second eleven and one-half and the last sixteen miles long and are equal to any paved street in Fort Worth or any other city.

Work on the system of good roads was commenced in rather a small way May 24 last year and practically two months was required to get things systematized, but since then, except when work was interfered with by rain or unusually cold weather, very satisfactory progress has been made.

Last December was a bad month because of frequent rains, but in reality these rains were blessings in disguise, for they placed the ground in good condition for work.

Through the spring and early summer the work was carried on rapidly until it again was interrupted to a certain extent by the heaviest rains for years.

All over Texas the heavy rains of the summer played havoc with roads under construction and thousands of dollars in damage resulted, but through it all the work on Tarrant county roads stood the test, which probably was the most severe they could have received.

This system of highways is being constructed from a \$1,000,000 bond issue voted in December, 1911, and there remains at present in this fund approximately \$120,000. Engineer Travilla says that this will be ample for completing the work.

"I have handled many jobs of road-building," Mr. Travilla said, "but in none of them have I ever seen better roads and in none have the contractors been more conscientious. When the roads all have been finished Tarrant county will have the best system of highways of any county in the state and equal to any county in the United States."

* * *

New Mexico.

"I trust the counties will recognize that the state cannot do it all and that the counties should exert themselves to unite in constructive, systematic road building," declares State Engineer James A. French, of New Mexico, in a public letter mailed out recently to every county commissioner in the 26 counties of the state. Mr. French's letter is an appeal to the county commissioners to avail themselves of the privilege of using a special levy of five mills as authorized by a law passed in 1909 for the purpose of building public roads. Mr. French calls attention to the vastness of New Mexico and its small population, and admits that the question of financing road building "is one of very serious import." But he finds encouragement in the fact that "if the counties make a five mill levy the annual receipts would be \$450,000, giving over four million dollars for road purposes in the next ten years." Mr. French finds that this method of raising money has been in effect in Valencia county and with marked success.

* * *

Tennessee.

Active co-operation with the Tennessee Highway Association and other good roads organizations of the state in securing passage of proper legislation for a state highway commission and state aid for highways by the next legislature, was pledged by the executive committee of the Chattanooga-Athens-Knoxville Highway association at its meeting in Chattanooga recently. Every town and city of importance in the district was represented at this meeting.

Although it was generally believed by all present that the next legislature will listen to the insistent demands which are being made all over Tennessee for a state highway commission, regardless of any political differences, the reviving of the bill for the creation of the Chattanooga-Athens-Knoxville Highway Improvement District, which failed by a narrow margin before the last legislature, was discussed as an alternative. It was unanimously decided to hold intact the balance of the highways fund for the present. It was their opinion that the funds could be used to better advantage in co-operation in the fight to be waged for a proper state highway commission bill and in securing early recognition for the highway from the commission when

created. The members of the committee, as well as those in the ranks of the association, will continue active and aggressive work for the highway in the counties where they reside and through which the highway will pass.

Members of the committee reported marked improvement in the condition of the highway through their respective counties, and in other counties which have become interested since the association was formed. Some counties, it was reported, have built an entirely new road, or improved stretches of old road, from county line to county line. Others have laid plans to build their section just as soon as the money can be secured.

Improvement and permanency are the objects, as the road exists and carries much local and tourist traffic.

* * *

Washington.

Governor Lister has accepted the invitation of the Washington State Good Roads association to take charge of the sessions the evening of November 18, during the annual convention of the association in Spokane. The governor will speak and has arranged for Sam Hill of Portland and Maryhill to deliver his well-known stereopticon good roads lecture.

Governor Lister also has accepted an invitation to respond to the toast, "Our State," at the good roads banquet the following evening, November 19.

* * *

West Virginia.

Fifty percent increase in the total mileage of permanently constructed roads in West Virginia in a single year is the record of 1914, according to Engineer A. D. Williams, Morgantown. At the beginning of the year, the State possessed 600 miles of permanent roads. During the year 325 will be constructed.

Of the improved highways this year, 40 miles will be of concrete, 50 miles of brick, and the remainder of macadam, sand clay or other substantial materials. Nearly every county in the state also is making culverts and bridges of a permanent kind, and the gain in that direction will be important.

"The fact that everybody in the State has become a booster for the construction of permanent roads insofar as it is possible, and that the knockers have been silenced, makes the situation really the brightest it has ever been in the State," declared the road engineer. "If the percentage records for this year for the building of permanent roads can be kept up for a few years, West Virginia soon will be entirely out of the mud."

Pocahontas county has just made a request to the board of control for twenty-five prisoners, which will be arranged for at once. A road will be graded from Marlinton to the Virginia line by way of Minnehaha Springs and will be repaired.

In Barbour county the progress in road building and repairing has been rapid. The county has purchased four heavy road machines, and as many traction engines, and they have been kept in operation practically all summer.

Macadam roads are being built in every district, with the possible exception of one, Greenbrier county, and several miles of the same kinds of roads are being built in Pocahontas county.

The State roads department of the University of which Mr. Williams is chief, has held road meetings in fifty-one of the fifty-three counties of the state, and the other two will be visited before the summer is past.

GOOD ROADS NOTES IN BRIEF

It is reported that Boone county, Kentucky, voted a bond issue of \$75,000 for roads on Nov. 3.

Road district No. 1 of Kimbel county, Tex., will issue bonds for \$25,000 for road building.

Liberty county, Tex., has voted \$25,000 of bonds for road construction.

Morgan county, Tenn., will pike 100 miles of road at an estimated cost of \$27,000.

Road district No. 1 of DeSoto county, Fla., will vote next month on a bond issue of \$210,000 for roads.

Texas City, Tex., votes next month on a bond issue of \$65,000 for streets.

Clanton county, Ala., has contracted for the construction of a section of the Montgomery-Birmingham highway at a cost of \$25,000.

Dallas, Tex., will build 3,000 feet of pavement.

Caroline county, Md., has awarded contract to build a short stretch of state-aid road at a cost of \$10,748.

Louisville, Ky., has contracted for street paving amounting to \$10,000.

Selma, Ala., will construct 5,300 square yards of concrete pavement with a bituminous wearing surface.

Tulsa, Okla., will lay 20,000 square yards of asphaltic concrete pavement.

Randolph county, Ala., has contracted for 7 miles of road at a cost of \$8,000.

Ashland, Ky., will lay 19,628 square yards of vitrified brick paving on concrete base and 12,304 linear feet of concrete gutter and curbing.

Cumberland county, N. C., will build five miles of sand clay road.

Kinston, N. C., will spend \$75,000 on streets.

Tom Green county, Tex., will lay 2040 square yards of bituminous macadam.

Washington county, Fla., will build 18 miles of good roads.

Road district No. 4, Zavalla county, Tex., has issued bonds for \$20,000 for roads.

Marianna, Fla., has voted \$3,000 of bonds for streets. Baltimore, Md., has awarded contracts for paving alleys with concrete amounting to \$14,000.

Bartlesville, Okla., has contracted for 3500 square yards of street paving.

The city of Charlestown, W. Va., has contracted for the paving of 29 streets, aggregating 64,691 square yards.

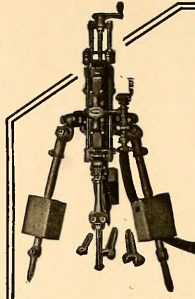
The state highway department of Louisiana has contracted for the construction of 16½ miles of roads in St. Tammany parish.

Lancaster, S. C., has contracted for 10,000 square yards of concrete sidewalks.

Louisville, Ky., will re-pave 9th street at a cost of \$10,500.

Sulphur Springs, Tex., has contracted for 2,000 feet of concrete curbing.

Poncombe county, North Carolina, has available for road construction about \$60,000. This will be used in the construction of a bituminous macadam highway.



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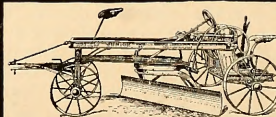
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Tulsa, Okla., has awarded a \$16,500 street paving contract.

Warren county, Miss., will build two miles of road at a cost of \$1600.

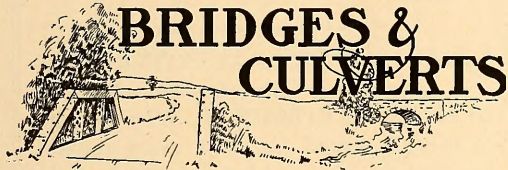
Bibb county, Ala., is asking for bids on a section of the Centerville and Blockton road.

Charlotte, N. C., will spend \$8,500 on street improvement.

Cullman county, Ala., will surface with slag and chert a section of the Bremen road to cost \$6500.

West Tulsa, Okla., will pave 10 blocks at an estimated cost of \$12,000.

BRIDGES & CULVERTS



Independence county, Ark., will construct two iron bridges.

At Chattanooga contract has been let for a bridge across the Tennessee river, at Market street, at about \$500,000. The bridge is to be 2450 feet long and 50 feet wide.

Pulaski county, Ark., has appropriated \$5,000 to be used in erecting a bridge over, the Arkansas river, between Little Rock and Argenta.

The erection of a bridge across North River, at St. Augustine, Fla., at a cost of \$30,000 is contemplated.

Newton county, Tex., contemplates the issuance of \$200,000 of bonds for bridge and road work.

Crittenden county, Ark., will build 30 bridges in connection with drainage work, at a cost of \$30,000.

Salerno district, Palm Beach county, Fla., has voted bonds for \$100,000 to be used in the construction of bridges, culverts and roads.

Elbert and Madison counties, Ga., have contracted for a bridge across the Broad river, 500 feet long, to cost \$10,195.

New Orleans will build a bridge across London Avenue canal at a cost of \$8,000.

Warren county, Miss., will bridge the Big Black river at Holt's Ferry.

Cole and Osage counties, Missouri, will build a bridge Osage river at a cost of \$65,000. The bridge will be 600 feet long.

Davidson county, Tenn., will build 7 re-inforced concrete bridges at a cost of \$7,000.

The commissioners of Coleman county, Tex., have contracted for a bridges to cost \$63,000.

Plans are being drawn for a bridge across Brays bayou, at Houston, Tex.

Gaston and Mecklenburg counties, North Carolina, will bridge the Catawba river at a cost of \$18,172.

Wilson county, Tennessee, will build seven bridges to cost about \$10,000.

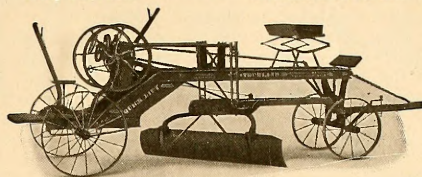
Manatee county, Fla., plans the expenditure of \$85,000 for bridges and culverts in the fifth district.

Good Roads in Virginia.

Hon. G. P. Coleman, the Virginia state highway commissioner lays "down the shovel and the hoe" long enough to tell something of this good roads movement in Virginia. He tells a short simple story with a good ring to it. Here it is:

The State Highway Commission of Virginia was organized in 1906. The legislature of that year placed in the hands of the commissioner \$25,000 for the years

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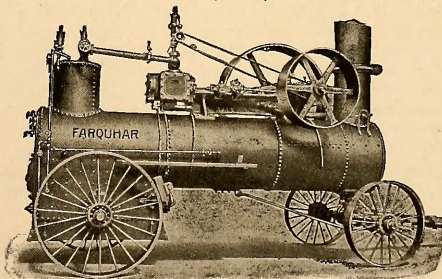
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1906-7, to be used in such counties as should make application for state aid. The state at the present time is giving state aid in two forms to the various counties of the state constructing roads or bridges.

One form, that of convict labor, is supplied to the counties free of cost; that is, the state feeds, clothes and guards the men, placing them on the work free of cost to the county, but it is necessary for the county to supply the tools, teams and machinery, and to pay all free labor, the object being that the labor furnished by the state should be one-half of the cost of the work. We have convict camps working in thirty counties of the state, and the number of men in these camps varies from thirty-five on the lighter class of construction to seventy-five on the heavy work. In these various camps we have a total of approximately 1,700 men. It costs the state to feed, clothe and guard and otherwise take care of these men approximately 50 cents per ten-hour working day.

Good Money for Good Roads—How it Comes.

In addition to this, the legislature of the state appropriated for this year \$185,000 in money aid and the automobile tax, which will amount to \$115,000, making a total in the state-aid fund of \$300,000. This fund is distributed to the counties not using convict labor. Where this form of aid is used the state requires that the county shall put up an amount equal to the amount supplied by the state. The work under both forms of aid is done under the supervision and general direction of the commissioner.

At the present time we have under way approximately 175 pieces of road and bridge work, distributed through ninety-odd counties of the state, the sections of road work varying from a mile to twenty-five miles in length, a great many short sections being built to connect up pieces of road already constructed. We expect to complete this year between 500 and 600 miles of improved roads at an expenditure of about \$1,500,000. Of this amount the state has contributed for 1914, for road and and bridge work, aid to the amount of \$466,000. This amount will be increased for 1915 to \$500,000. The county levies are raised either from direct levies or by the issuance present time thirty-five counties have issued bonds in the state amounting to \$6,675,100, and the state has appropriated to date \$1,717,518, making a total for all road purposes of \$8,392,618. Of this amount we have expended approximately \$7,000,000, and have constructed between 2,500 and 2,600 miles of improved roads and 160 bridges. These sections of road are scattered throughout the different counties, but they are gradually being connected up into through systems of road; that is, we will have completed in a few years three through routes from Maryland to the North Carolina line, and one through route from the sea through through the entire length of the state to the Tennessee-Kentucky line, with a number of shorter sections joining these through roads, connecting the various small towns and cities. In addition to this, we are building a great many short sections connecting the farming districts with other shipping points.

No definite plan for a system of state roads has as yet been adopted by the state as a whole, but a great many counties have laid out a system of county roads which contemplate being connected up with the roads of the adjoining counties, and in this way the state will ultimately develop a fairly complete system which will reach every county and district of the state.

Good roads result in good schools and churches.



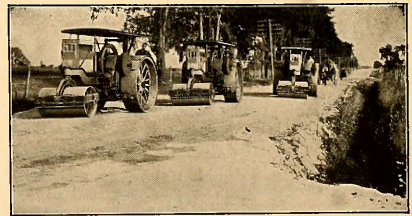
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The I H C Road-Roller Tractor is a favorite because it is of simple mechanism; is economical in fuel; has moving parts thoroughly protected from dirt and grit; is always ready for work on the instant.

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SOUTHERN GOOD ROADS

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How the Georgia Good Roads Movement Was Stimulated

By S. W. McCALLIE, State Geologist

THE latest statistical data collected by the State Geological Survey on the public roads of Georgia shows that the total road mileage of the state is approximately 84,000. Of this mileage possibly 10 per cent., or 8400 miles, are improved roads. The term improved roads as here used embraces all macadam roads, gravel roads, chert roads, shell roads and sand-clay roads, together with such common earth roads as have been graded, crowned, drained by side ditches or otherwise improved. Fully 75 per cent. of these improved roads are sand-clay roads, a type of road constructed at a low cost and at the same time well suited for the light traffic of the rural districts.

The roads of this state are constructed and maintained chiefly by convict labor. Of the 148 counties, 122 now employ convict and 26 statute or hired labor, the total number of convicts employed, as shown by the last report of the State Prison Commission, being 5182.

The expenditures on public roads and bridges in the state, as shown by the latest available data, were \$659,002 commutation tax and \$1,770,697 property tax, making a total annual money expenditure of \$2,504,699. To this sum should be added \$2,000,000 as an estimated money value of convict labor furnished by the state, together with the value of statute labor of the counties not using convicts and those using both convicts and statute labor, which makes a grand total expenditure of approximately \$4,500,000 per annum. In comparing the road expenditure of the state with the estimated road mileage it will be seen that Georgia is spending annually \$53.57 per mile on her public roads, or \$1.73 per inhabitant, based on the last federal census. The revenues for constructing and maintaining public roads are derived from three different sources, namely, commutation tax, special road tax levied by individual counties and by county bond issue. The greater part of the revenue is obtained, as shown by the above figures, from commutation and special road taxes; however, a number of the counties has issued bonds for road improvement.

The class of roads now being constructed, as above stated, is chiefly of the sand-clay type. These roads are constructed of natural or artificial sand-clay mixtures. The method of constructing sand-clay roads of natural sand-clay mixtures in common use in the northern part of the state is thus described by Prof. C. M. Strahan of the University of Georgia:

"The grading of the roadbed is first done to a width of 30 feet.

"In the center a bed of top soil 10 inches deep and 16 feet wide is laid. The teams haul over this bed as

the work progresses. With clay foundation. It would be a mistake to prepare a trench to receive the top soil.

"The road machine excavates flat side ditches six inches deep and four feet wide, throwing the earth as a shoulder against the top soil bed, and then crowning the whole from ditch to ditch.

"The construction teams and traffic pass over the green bed, and pack it down chiefly in the center. When several hundred yards are thus partially packed, the road machine pulls in the material from the sides and resurfaces the bed. New top soil is delivered for weak places and shaped up.

"As fast as the grading of the bed is finished the top soil layer is spread on it. Thus by the time one-half mile of road has been graded and covered with top soil the first one-fourth mile has undergone considerable packing and resurfacing and getting into good shape.

"For some weeks close attention is paid to the new bed, watching for weak places, doctoring them, maintaining the grade with new top soil and keeping the crown fully up to one inch per foot."

The cost per mile to Clarke county of putting on this "top-soil" coat, according to Professor Strahan's estimate, using convict labor at 50 cents per day and the county teams at \$1 per day, is \$400.

The material which is used for road surfacing in Clarke county, designated as "top soil," is a residual sandy clay, resulting from the weathering of granites and granite-like rocks. It usually contains 50 per cent, or more of hard, coarse residue, consisting of quartz and feldspar, the latter often partially altered into kaolin. Experience shows that the best "top soil" is found in cultivated fields, where the fine particles of mica are wanting and the clay has the essential plasticity. The results which have been obtained in Clarke county with the natural sand-clay mixture are very satisfactory, and the work fully demonstrates what can be done throughout the crystalline-area region of Georgia, where like material for building sand-clay roads is abundant.

In South Georgia the sand-clay roads are made largely of natural sand-clay mixtures; however, often artificial mixtures have to be resorted to when the natural mixtures are not immediately at hand—a condition met with only in the more sand localities. A good illustration of sand-clay roads of natural mixtures in the southern part of the state are those of Sumter county. Here the material used is a reddish, sandy, residual clay obtained directly from the roadside. The only attention necessary to keep these roads

in first-class condition, after being properly graded and drained is an occasional use of the split-log drag. These roads are what may be termed ideal country roads, over which from eight to ten bales of cotton may be drawn with comparative ease by a two-horse team.

In general, it might be stated that the public roads of Georgia are in a fair condition and are rapidly improving. At our present rate of road construction all of our main public highways should be put in excellent condition within the next decade.

Probably the most effective stimulant that the good-road movement of Georgia has received in the last few years has been brought about by a system of road maintenance recently put into operation by the American Highway Association in co-operation with the federal office of public roads. The plan as originally outlined was the maintenance of a continuous public highway from Washington to Atlanta by way of Richmond, Raleigh, Columbia and Augusta. To carry out this plan it was stipulated that the federal office of public roads was to furnish three of its engineers continuously on the road, and for the county authorities along the route to place the section of road lying within their re-

spective counties under the direction of these government engineers, who were to direct the expenditure of such funds as were raised by the counties. The American Highway Association, in turn, was to furnish each engineer with an automobile and to look after the preliminary and incidental expenses. The location of this line of road in Georgia from Augusta developed an unusual amount of friendly rivalry, owing to two routes being feasible—one by way of Athens and the other by way of the Georgia railroad. To settle the matter without any hard feelings, both routes were selected, so that in place of having one route, as originally planned, from Augusta to Atlanta, there are two routes, making a total of nearly 300 miles. It was, indeed gratifying to see the amount of interest the individual counties traversed by these roads took in the matter of putting their roads in proper shape to be received by the federal engineers. Bridges were built, hills cut down, roads in many places relocated; but the most important lesson to be taught by these two different lines of road is an up-to-date system of road maintenance, which has heretofore been one of the weak points in Georgia's highway improvement.

Proceedings of American Road Congress

Atlanta, Ga., November 9-14, 1914

Easily the greatest good roads meeting ever held in any country in the world was the Fourth American Road Congress which held its sessions in Atlanta, Ga., during the week of November 9, under the auspices of the American Highway Association, the American Automobile Association and 46 other national and state associations. Actual registrations numbered 3306 exclusive of local attendance which was not registered after the first day. Exhibits shown by 100 manufacturers crowded every available foot of space in the huge auditorium, overflowed two city blocks in a temporary frame structure erected by the city and extended for two additional city blocks under a nearby viaduct. From nine o'clock in the morning until ten at night every aisle in the exhibit halls was crowded with an interested, eager throng who found ready for their inspection every conceivable kind of equipment, apparatus, material and method for the construction and maintenance of roads and bridges. Some of the exhibits were exceedingly ingenious and included miniature moving pictures, operating models run by electric motors, actual demonstrations of road construction on a small scale, while the seeker after good roads literature was able to compile a handy little library in his journeys from booth to booth. A striking feature of the government exhibit at this year's congress comprised a very complete set of moving pictures illustrating construction of the various types of road and the effect of road surfaces on traffic. The moving picture room was crowded throughout the congress. Probably the most striking exhibit at the congress was that made by the New York state highway department and consisted of a huge topographically accurate model of the great Storm King mountain with the Hudson river sweeping past its base. Along the face of the great Storm King was shown a highway under construction by the present state highway department of which John N. Carlisle is commissioner. A number of other states had interesting exhibits of maps, pictures and models.

A most pleasing relaxation from the commercial and technical features of the congress and exhibits, was af-

forded by daily organ recitals which enabled the thousands of delegates in attendance to hear Atlanta's famous pipe organ, which cost \$50,000 and which is considered the most superb pipe organ in the south. One booth which held the close attention of many hundreds of visitors exhibited clothes and shoes for convicts. The shoe exhibit was of historic interest as it showed the development from the torture shoes worn by Siberian convicts to the durable and comfortable shoes now supplied to convicts in America.

Austin B. Fletcher, president of the congress, who is also state highway engineer of California, called attention in his opening address to the fact that the purposes of the American Road Congress were to bring about better legislation, better financing of road construction and maintenance, better methods of construction and maintenance, better regulation of traffic, a careful study of the possibilities of convict labor for road improvement, and that in short the question of good roads touched human welfare at so many angles as to make the deliberations of this congress of material importance to every citizen of the United States. Logan Waller Page, president of the American Highway Association and Director of the U. S. Office of Public Roads pointed to the fact that during 1914 more than 18,000 miles of hard surfaced roads had been constructed in the United States or more than three-fourths the length of the entire national road system of France. He urged that greater efficiency be sought and he believed it possible to save from our annual expenditure now reaching more than \$205,000,000 a year, at least 25 per cent or \$50,000,000 through efficient management. An exceptionally large number of men eminent as highway engineers presented in keen analytical papers the difficult problems connected with the building and maintenance of roads. Among these were notable papers by Henry G. Shirley, Chief Engineer of Maryland, on Heavy Traffic Roads; by S. Percy Hooker, state superintendent of highways of New Hampshire, on Light Traffic Roads; by Col Wm. D. Sohler, Chairman, Massachusetts Highway Commission, on Maintenance of Surfaced Roads; by Aus-

tin B. Fletcher, State Highway Engineer of California on Rights of Way; and by Henry W. Durham, Chief Engineer of Highways of New York City, on Street Construction and Maintenance. Prominent in the discussion of these and other technical papers were Frank F. Rogers, State Highway Commissioner of Michigan, W. S. Gearhart, State Highway Engineer of Kansas, Geo. W. Cooley, State Highway Engineer of Minnesota and Wm. R. Roy, State Highway Commissioner of Washington.

System in road management was urged in a strong paper by Chas. J. Bennett, state highway commissioner of Connecticut; W. S. Keller, state engineer of Alabama, demonstrated by the soundest sort of logic the necessity of engineering supervision of road construction. J. E. Pennybacker, chief of road economies of the U. S. Office of Public Roads, laid down ten axioms, the following of which he asserted would mean the construction and maintenance of roads on an economically sound basis. For the first time since the road congress has been holding its annual sessions, the National Civil Service Reform League officially participated under the chairmanship of Richard Henry Dana, president of the league, in a session devoted to the merit system in road administration. Why and how the merit system should apply in the appointment of road officials was ably demonstrated by George R. Wales, chief examiner of the United States Civil Service Commission and Arthur M. Swanson, chief examiner of the Philadelphia civil service commission. A. N. Johnson engineer of the bureau of municipal research of New York City, urged state control of road work as the solution of the efficiency problem. Ways and means of developing and improving the courses of instruction in highway engineering in our educational institutions were advanced by Prof. Hector J. Hughes of Harvard University, Prof. E. V. McCaustland, Dean of Engineering of the University of Mis-

souri, Prof. C. M. Strahan, Dean of engineering of the University of Georgia and a number of other prominent educators.

Most far reaching in its possibilities along the lines of official co-operation was the action take by the state highway commissioners and engineers present through the formation on November 11 of an organization tentatively designated as the association of state highway commissioners and engineers. Preliminary steps were taken for the purpose of organization and a formal meeting called to be held in Washington, D. C. on December 12.

Resolutions were adopted by the congress as follows:

Resolved, that the American Road Congress emphatically endorses the principle of federal co-operation toward the construction of main highways and thus assist the several states to build the main market roads on the one half of the country which is devoted to agriculture and to build through main roads in the one half of the country which is not predominantly agricultural, but whose prosperity depends upon mining, the raising of live stock, and the presence of the health seeker and tourist.

Whereas, the American road congress believes in and has long urged all states to enact uniform road legislation, and

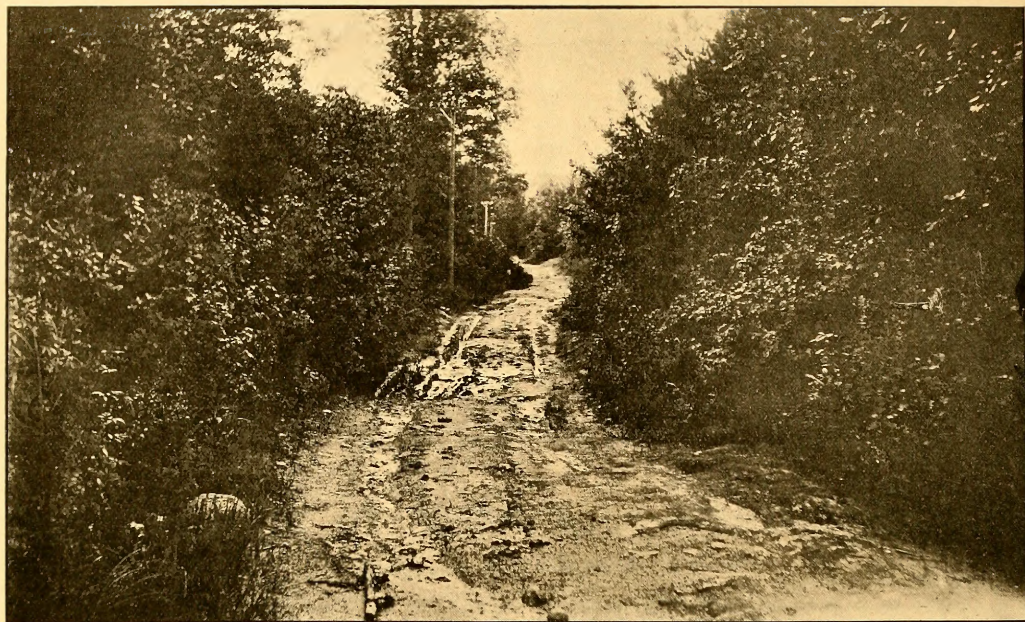
Whereas, experience has abundantly demonstrated that efficiency and economy are not obtained in the construction and upkeep of main roads, except by the co-operation of the states through skilled departments, and

Whereas, forty of the forty-eight states have enacted state legislation; Georgia, Indiana, North Carolina, South Carolina, Tennessee, Arkansas, Florida and Texas, being the exceptions, and

Whereas, federal aid and co-operation is near at hand, and it is probable that states having no highway



Old Ford on Gunpowder Creek, near Hudson, seven miles from Lenoir, N. C., replaced by the fine bridge shown on the cover



Section of the Lenoir-Hickory road, just south of Gunpowder Creek bridge, before improvement by funds raised by private subscription
Photo by Mr. G. F. Harper, of Lenoir, N. C.

departments will be unable to participate in such aid, therefore be it,

Resolved, that the American Road Congress in annual convention assembled in the city of Atlanta embracing several thousand delegates representing every state, reaffirm its belief that state road departments and state aid are essential to secure efficiency and economy, and be it further

Resolved, that copies of these resolutions be sent to the governors of all states and to their various highway officials and that they be urged to promptly commend such laws to the legislatures in their respective states.

Resolved, that the Lincoln Highway Association be commended for its successful voluntary effort in arranging with counties, cities and townships for a connected series of roads across the United States, thus providing a definite and continuous route to be used wholly or in part by those who wish to become acquainted with the agricultural, mining and scenic advantages of their own land.

Resolved, that the American Road Congress deplore the frequent accidents on the public highways and urge upon the various highway officials or other authorities throughout the United States the enactment of the necessary rules and regulations to ensure the public safety.

Resolved, that the federal government be urged to build highways across all Indian and Forest Reservations and all other federalized areas, where such connecting links are essential parts of established through routes of travel.

Resolved, that the sincere thanks of the American Road Congress be extended to the state of Georgia, the county of Fulton, the city of Atlanta and to the public press for their active co-operation, generous hospital-

ity, and assistance generally in making this the most successful road congress.

At the annual banquet of the congress eloquence and repartee mingled with sound logic and useful information. The three most talked of addresses at the banquet were those of Col. Wm. D. Sohler of Massachusetts, Charles P. Light, field secretary of the American Highway Association, and Richard H. Edmonds, editor of the Manufacturers' Record.

At the opening of the second day's session of the congress a burst of prolonged applause greeted the reading of a letter from President Woodrow Wilson in which he earnestly commended the work of the congress and urged the importance of improving market roads. President Wilson said:

"My dear Mr. Fletcher:

"It is with keen regret that I find it necessary to forego the pleasure of attending the Fourth American Road Congress. Will you convey to the congress my deep interest in the important work they have undertaken.

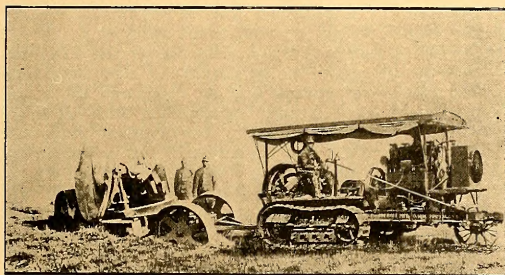
"The problems of bettering local transportation, in my judgment, are among the most important which our country has to solve. When we consider that we are already expending something over two hundred million dollars annually for the construction and maintenance of our roads, we should give the fullest consideration to the question of how to obtain results commensurate with this outlay. I have particularly in mind better road management and better maintenance of the roads already constructed. These I consider of as great importance as the expenditure of additional money.

"I believe that the annual road congress can materially aid in bringing about the solution of our many road problems."

Atlanta's hospitality won the instinted admiration

of the thousands of delegates in attendance. The social features included a brilliant reception by Governor and Mrs. Slaton at the capitol, the annual banquet of the road congress, a delightful tea to the visiting ladies of the congress at the Georgian Terrace Hotel, a dinner given by the Mayor and Council of Atlanta to visiting officials, a "possum" dinner at the convict camp and automobile tours over the hundreds of miles of well constructed Fulton county roads. A large number of Atlantans donated their cars for the exclusive use of the delegates throughout the week and it was announced at all sessions of the congress that delegates could consider any car carrying the American flag to be available for his use upon request.

A conference of prominent women held under the auspices of the Woman's Department of the American



A Caterpillar Tractor hauling one of the famous German siege guns that so completely demolished the Belgian forts at Lieges and Antwerp

Highway Association was successful in point of attendance and in the working out of a plan for the organization of local women's clubs in community centers to carry on educational and propaganda work for good roads. The conference was presided over by Mrs. Robert Baker, chairman of the Women's Department and was featured by many interesting addresses among them in illustrated lecture by J. E. Pennybacker of the U. S. Office of Public Roads.

On the evening of November 12 the annual meeting of the American Highway Association was held and officers for the ensuing year elected. The members of the association learned with much regret that Logan Waller Page, who has been the president since the formation of the association in 1910, was unable to serve as president another year. Mr. Page stated his intention of loyally supporting the work of the association in any minor capacity that the members might choose to allot him. The officers elected were as follows: Fairfax Harrison, President, Logan Waller Page, vice-president, Lee McClung, treasurer, directors W. Tom Winn of Atlanta, Georgia, E. J. Mehren, editor Engineering Record, Charles D. Blaney, chairman of the California Highway Commission, Col. Wm. D. Sohler, chairman of the Massachusetts Highway Commission, S. E. Bradt member, Illinois State Highway Commission, A. G. Batchelder, chairman, executive committee, American Automobile Association, Bryan Lathrop, Lincoln Park Commission, Chicago, Leonard Tufts of Pinehurst, N. C., and Richard H. Edmonds, editor of the Manufacturers' Record. The Board of Directors consists of twenty-three members, approximately one-third of this membership being elected annually to hold office for a term of three years. An amendment to the constitution was adopted making all the executive officers, except the president, vice-president and treasurer appointive by the executive committee instead of elected as heretofore. The present executive secretary I. S. Pen-

nybacker and field secretary, Charles P. Light, are retained in office. The association was shown by the annual report of the executive secretary, to be in excellent condition from the standpoint of finances and membership, while in point of achievement excellent results were shown. By far the most important work of the association during the coming year will be comprised in the work of the legislative committee which will continue the duties of the committee appointed by the Third American Road Congress in Detroit last year looking to the revision of road laws in the several states. This committee is expected to co-operate directly with the governor and legislature of each state. The membership of the committee has not yet been announced.

A vigorous contest for the 1915 congress was waged by Rochester, Kansas City, Indianapolis, New Orleans, Peoria, San Francisco, Spokane, Galveston, Dallas and Baltimore. As the meeting place is determined by the executive committee and not by the congress en masse the invitations of these cities were taken under consideration by the committee, and it is probable that an announcement of the committee's decision will be made in the near future.

Governor Craig Favors Federal Aid.

Governor Craig, of North Carolina, is interesting himself in procuring the passage of a bill before the next congress to aid in building good roads through-



Convicts Building a Section of the Hickory Nut Gap Road Near Bat Cave, N. C. All of the width of the road has to be cut of the mountain-side

out the country and has interested nearly all the governors of the southern states in the movement.

The North Carolina executive has forwarded the following letter to President Wilson:

"His Excellency, the President of the United States, Washington, D. C.

"My dear Mr. President—

"I earnestly hope that congress will, in accordance with the pledge of the Baltimore platform, pass a good roads bill at the coming session.

"Public sentiment overwhelmingly demands it, and will sustain you in urging upon congress a well directed federal co-operation in road construction and maintenance."

A copy of the above letter was, sometime ago, sent to the governors of all the southern states, and replies have been received from nearly all of them saying that they will heartily co-operate with any such movement, and they have so written President Wilson.

Heavy Traffic Roads

By HENRY G. SHIRLEY

Chief Engineer, Maryland State Roads Commission

THE RAPID CHANGE that has taken place, and which is daily taking place in the character of traffic on our highways, makes the selection of the type of surface more difficult each day for the highway engineer. In selecting a type of surfacing for any particular road, the engineer not only has to study the amount and kind of traffic that daily passes over the road, but has to make a very comprehensive study of the amount and kind of traffic that will probably pass over the road in the future, by virtue of the development of the surrounding territory on account of the improved road.

The writer has made studies of roads where the traffic, before improvement, consisted of light vehicles and

soft local limestone for the metal surfacing, but which had sufficient strength and hardness to carry the traffic that was passing over the road at that time. Scarcely had the road been completed when several large tracts of woodland, not a great distance from the road, were cut down, and the lumber was transported on wagons, drawn by large traction engines with cleats, over the road to the railroad station. The effect of this heavy traffic on the soft limestone surface can be easily surmised.

Drainage of a road-bed that is required to carry heavy traffic, should be well taken care of by tile or other sub-surface drains, so as to render the sub-foundation as dry and firm as possible. The maximum grade should not exceed a 6 per cent, and the alignment should be as straight as possible, with all sharp curves and bends eliminated. The width of the roadway and the width and thickness of the metal surfacing should be designed to meet the requirements of the present as well as the future traffic which it will have to accommodate, but the minimum width should not be less than 30 feet, nor the metal surfacing less than 18 feet. Broken stone or gravel make a fair foundation, but concrete is almost as cheap and is more preferable.

The thickness of macadam and gravel should not be less than 5 inches after rolling, nor more than 10 inches, while concrete should not be less than 4 inches, nor more than 8 inches, depending primarily, upon the character of the soil of the sub-base, and the intensity and character of traffic it will have to sustain. In some cases where the loads are very heavy, but the number of loads small, it has been found economical to lay a strip of high-class and durable pavement in the middle of the road for a width of 9 to 14 feet, with a cheaper and less durable material on each side.

Before selecting the type of pavement to be used, a close and accurate census of the different kinds of traffic should be taken, a very thorough study made of the surrounding section, and an estimate made as to the possible increase of the different kinds of traffic, or the decrease of one kind and the large increase of the other. It is the opinion of the writer that in no other line of engineering should there be a larger factor of safety used than in estimating the amount, intensity, and kind of motor and self-propelled traffic that will pass over our improved roads in the near future. The great change in the character of traffic developed in the past five years, is but a small index to what can be expected in the next five years to come.

The types of pavements used on heavy traffic roads should be selected as to their fitness to stand the kind and intensity of the traffic that will travel them. Roads in the outlying districts, where horse-drawn traffic comprises the larger percentage should be constructed of macadam with a light surface treatment. Concrete will also be found serviceable and desirable. Where motor traffic is in the majority, bituminous macadam or concrete will give good results. Near the centers of population, where the traffic is mixed and heavy, concrete, bituminous concrete, asphalt or vitrified brick will prove the most economical. Where the heavy traffic is concentrated, brick, asphalt or stone block are the most suitable.



HENRY C. SHIRLEY

nothing heavier than two-horse loads, but as soon as the road was reconstructed, the amount of traffic increased from 50 to 300 per cent, and the loads from light two-ton loads to ten to twelve-ton motor trucks, and fourteen to eighteen-ton tractors. He also recalls constructing a section of road through a very sparsely settled section, and estimating that it would be quite a long time before the adjacent territory would be more thickly populated, and accordingly selected a

*A paper read at Fourth American Road Congress, Atlanta, Ga., Nov. 9-14, 1914

There can be given no hard and set rule for selecting the type of construction that should be used on a given section of road to carry a known traffic. For local conditions, the availability of materials, etc., play such an important part in the selection of the type of surfacing in any locality, that each individual case must be worked out on its own merit.

The following method of selecting a type of surfacing to carry an estimated traffic, however, will prove fairly accurate where a study can be made and the maintenance cost can be had of roads constructed and maintained under similar conditions:

Where the annual cost of maintenance of a less durable type of road surfacing will exceed the annual cost of maintenance of a more durable type of surfacing, plus 4 per cent on the excess cost of the more durable type over the less durable type, the more durable type should be used, and vice versa.

The maintenance on heavy traffic roads should be continuous and thorough—never allowing the surface to remain broken any length of time, but as soon as the slightest defect or indication of failure appears, it should be speedily repaired.

The writer cannot close this paper on "Heavy Traffic Roads" without calling the attention of the congress to the great necessity for having adequate laws to regulate the heavy loads that have to be borne by the surface of the many hundreds of miles of roads that have been and are daily being constructed. The manufacturers of tractors, motor trucks, and other hauling engines, have given but little study to the effect and injury that is being done and may be done by the heavy loads propelled over the road surface, and the strain and stress caused by narrow tires, steel cleats, ribs, and other devices, but it seems that the greater amount of their energies have been to develop an engine or motor truck that will haul the largest load in

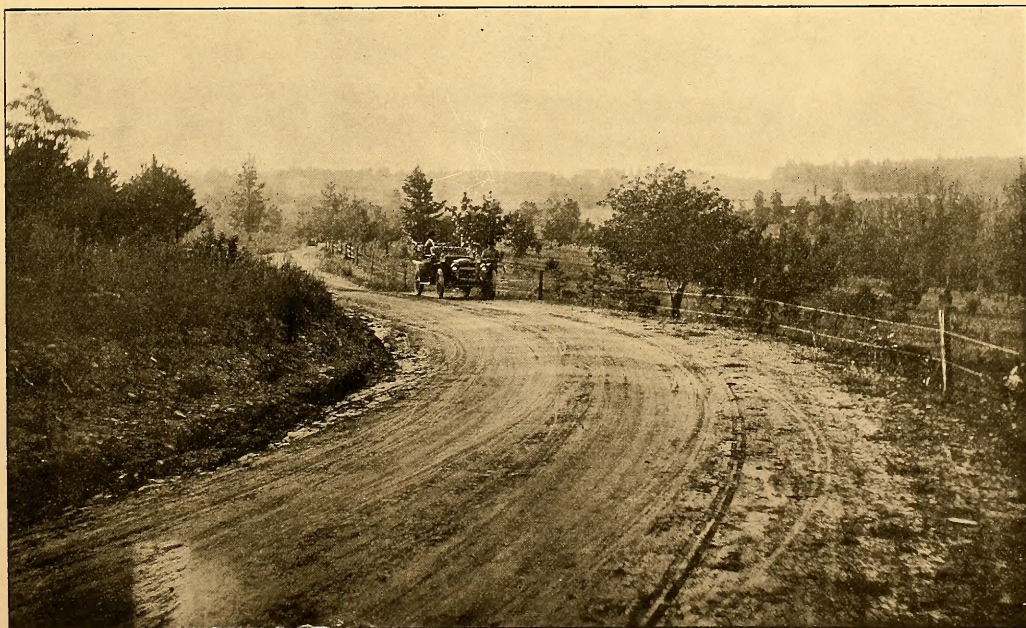
the shortest period of time using the least amount of fuel—all of which is very commendable, but it is the duty, as well as to the welfare of these manufacturers, to devote quite as much energy and brains in constructing their engines and motor trucks in such a way that the least amount of damage will be done to the surfacing in passing over the roads. It is most important that the manufacturers of hauling equipment and highway engines should work together in framing a set of adequate laws controlling the use of hauling equipment over improved roads, as well as developing wheels and other devices so as to do the road surfacing the least amount of damage. By co-operating and working together, large sums can be annually saved on maintenance, which will greatly benefit all concerned.

Good Roads Book for New Mexico.

A dispatch from Santa Fe, N. M., states that T. Harmon Parkhurst, of that city, has just completed a trip over the state roads of Northern New Mexico, between Raton and Los Lunas, taking photographs for the New Mexico Good Roads Book to be issued soon by State Highway Engineer James A. French.

Mr. Parkhurst is now engaged in a tour of the highways in southern New Mexico with the same purpose in view. The book is to be issued for automobile tourists with a view of inducing them to give New Mexico good roads a trial or to make their transcontinental trip by way of New Mexico.

The volume is to be superbly illustrated and will be a good piece of publicity for New Mexico, especially if supplemented by the volume planned by Land Commissioner R. P. Ervien, descriptive of New Mexico lands and industries and the official New Mexico souvenir book of the New Mexico exposition commission.



Section of the Lenoir-Hickory Road after improvement. Southern Good Roads is indebted to Mr. G. F. Harper, of Lenoir, N. C., for this and other excellent photographs of Caldwell county highways, some of which appear in this issue

Responsibility of Contractors in Carrying Out Designs of Engineers

*By MR. HAROLD PARKER

IF THE ideal could be realized the contractor would perform his work according to design and specifications without the aid of inspectors or supervisors or any others to enforce compliance therewith. This is, from my point of view, the actual responsibility of the contractor.

In order, however, to make this practical in its effect it must be understood that the relation between contractor and engineer should be modified and so placed as to establish better working conditions than now are possible. In other words, without lessening the responsibility of the contractor in any case, there must be recognized an equal responsibility on the part of the engineer who designs the road and prepares the description thereof. This responsibility on the part of the engineer is manifestly to make his description clear, concise and understandable and not to confuse it by undue legal phraseology or to cover any possible error or omission of his by throwing it onto the contractor to remedy or supply.

A contract is an agreement made between parties, the plans and specifications are a description of the work to be done. There should be no ambiguity in either, so that the responsibility of the contractor should be thoroughly understood by him, for he should know exactly what he must do in order to comply with the terms of his agreement. His responsibility then is to live up to every feature therein contained. Under such conditions, even the less erudite of the bidders for a proposed work can make an accurate estimate of the cost and there can be no opportunity to raise points of issue between the parties. This, in a broad way, is intended to point out the fact, that, under existing conditions, a contractor cannot be expected to live up to the highest standard of moral responsibility, because under the terms, he may be required to supply omissions, correct errors and be held liable for poor results of directions given by the engineer and because, also, the engineer is the arbiter in adjudication of any mooted questions.

The attitude of the engineer or designer and particularly the inspector delegated to execute the plan designed by another, is almost always more or less antagonistic to the contractor for these very reasons. The contractor is, so to speak, on the defensive for he never knows just what he may be required to do.

The specifications always imply that the contractor will skin the job as it is called or use poor material or do imperfect work. In short, it is assumed that the contractor will do no more than he is forced to do and the terms are generally such as to put it in the hands of the inspector or engineer to destroy any chance of profit, even when the contractor is conscientiously anxious to live up to the terms of his contract—if he is so inclined. The engineer not only inspects the work and material but he directs as to the way the work is to be done. He is the arbiter wherever a question arises between contractor and inspector; in other words, the person interested is the judge and may and often does render decisions arbitrarily unfair to the contractor. Where the terms of

an agreement are such as to leave the power in the hands of an interested party, it cannot be supposed that the ordinary contractor will place himself on a high moral plane and take upon himself any responsibility which is not expected. He will not, as a general thing, do any more than he knows he will be forced to do.

The question, therefore, as to the actual degree of responsibility the contractor should ethically be held for, is a debatable one. He certainly cannot be held in any way liable for the efficiency of the design; a contractor is ordinarily regarded as presumptuous if he offers his views to the engineer. If he suggests a change in method of doing work after a contract has been started, he is thought to be working a scheme by which he may gain some advantage, even if the cost is more to him.

As a practical fact, at present there is no doubt that the well-intentioned contractor properly equipped to do the work he undertakes and conscientiously determined to comply with every detail of the work he proposes to do and who carefully estimates the actual cost and adds a reasonable profit, is face to face with the adventurous bidder who has no intention of doing one job more than he is obliged to do and who slights every item he can get away with. The latter is always the lowest bidder and under the law or under the decisions of most public officials is successful in obtaining the contract. It is impossible, perhaps in a given case, to properly do the work for the price named, so his only escape from financial loss is to avoid responsibility and skin the job. How under existing conditions is it possible to secure satisfactory work when the system in practice tends in exactly an opposite direction? Public disapproval or condemnation attends the official or officials who refuse to award a contract for a road, to the lowest bidder; on the other hand, does not the public voice commend those who build their roads for the least money?

The public conception is wholly distorted and unfair. I venture to assert that until a degree of confidence is established and maintained between the engineer and the contractor, no public work will be as well done as it should be and the dear public is the loser. This confidence can only be created by the engineer specifying only exactly what he wants done and not, as now, involving the contractor in all sorts of ambiguities and obligations that he does not understand and placing over him as arbiter an inexperienced boy, a student in school, perhaps, by doing away with the present premium on irresponsibility by awarding the contract necessarily to the lowest bidder and by letting the work in as large units as is possible.

I do not mean to convey the impression that the fault lies wholly with the engineer who plans the work and prepares the specifications, my purpose is to indicate that as matters now are, most contractors do not feel the degree of responsibility that they properly should. It is by no means an unknown experience for a perfectly well-meaning contractor, when fulfilling, to the full, the terms of his agreement; to experience a harrassing interference on the part of inspector or perhaps of an engineer. This is often carried to such lengths that it is the cause of serious loss or delay. It may be abated

*A paper read before the State Good Roads Conference, Knoxville, Tenn., Feb. 24, 1914.

by the judicious outlay of more or less money by the contractor if he is willing to commit a crime. He is faced with two conditions to lose money or to become a criminal. In such cases, most contractors would prefer to give up a little money and gain the good will of the inspector.

I am continually preaching some modification in the form of contracts and specifications, which would be fair to the contractor; fair to both contractor and engineer—but I am met by the statement that if you leave a loop hole the contractor will take advantage of it and that therefore all specifications should contain every possible condition. In order to make sure the designer declares that if he has left anything out in his specifications, it must be considered by the contractor, as being included, notwithstanding that his representatives, the inspector or engineer, shall be the judge of every point at issue, both as to quantity and quality.

I tried, with my colleagues, to standardize specifications for the highway department of the state of New York. These were in line with what I have said above and were, in conjunction with the plan for organization of the department—the exemplification of my convictions.

Another serious condition that the contractor has to face, is the fragmentary monthly returns by the engineers. A contract, generally, declares that he shall be paid, each month, for 90 per cent of the work done during the previous month. It is often less than 50 per cent and the contractor has no redress—what good does it do him to complain to those higher up? The

tendency of all this is to relieve the contractor of responsibility, and to teach him to do just what so many are accused of doing, viz: to get his job completed with as little work and as poor material as he can get by the inexperienced, weak or criminal inspector.

The above is the cause of a large part of the so-called graft in the Highway Department of New York. I have stated some reasons why the contractor may fairly assume that his responsibility for work that he undertakes, is reduced to a minimum; nevertheless as stated, in the beginning, I believe that no contractor should bid on any work that he is not prepared to do absolutely as he reads the plans and specifications and this he should do even if there is no inspector, even to his own loss. If every contractor would follow this principle, better prices would prevail, better work would be secured, and fewer contractors would go to the wall.

It is believed that the Lincoln Highway will be followed closely by the party of 100 horsemen who expect to ride from Bangor, Maine, 4,800 miles to San Diego, Cal. Henry O. Weber, of Cody, Wyoming, is now acting as pathfinder for the trip, which will start about January 1. The 4,800 miles ride is to be undertaken in the interest of the Pan-American Exposition at San Diego, and \$15,000 in gold will be distributed as prizes. It is believed that Colonel William Cody—better known as Buffalo Bill—will start the riders on their long journey, and that Theodore Roosevelt will act as one of the judges at the finish.



Stretch of Improved Road, Sand Clay, Between Sanford and Jonesboro, in Lee County, N. C.

Efficiency of Highway Construction

By COL. E. A. STEVENS

State Highway Commissioner of New Jersey

THE very size and the commercial importance of the highway problem in these United States make efficiency necessary to a fully successful solution. To-day we can state the problem in general terms only. Even the total mileage of roads and what portion of them have already been improved are only approximately known facts. There has been but little done in the way of scientific planning of state road work, or of any nation-wide system. Yet, even thus, we can easily foresee an expenditure for roads, that, in its totals, is staggering. There is today no need of arguing the necessity of good roads. The questions to be answered are: Where will the roads to be built be located? What will they cost? How are we to insure that, once built, they will give us the service for which they were built, and for which the people are paying? In all of this how are we to insure that the man who pays the bill is not to be taxed more than need be, that he gets value received for every dollar expended?

It would be a foolish man who would undertake to dig the cellar and lay the foundation for his house without first deciding how much room he needed to house his family; how much he could afford to spend therefor; how he is to meet the cost of housekeeping, repairs, insurance, and taxes; and finally how all this is to be done without waste.

In such a case, it is easy to see the need of some forethought. In the much larger problem of providing good roads for this country of ours, the very immensity of the quantities and costs, and the difficulty of gathering the data necessary to state them with approximate accuracy, or the failure to realize the importance of this knowledge, seems to have prevented preliminary study. With our usual national impatience and confidence in ourselves, we have in general tackled the problem with a view limited to a solution over a very narrow field. Since we took up the subject twenty years or so ago, the problem of administration, design, and construction, have been changed by motor traffic. This traffic has made the road a matter of general and not of local interest; has shown us that hitherto approved methods of construction are no longer generally available, and that systematically organized methods of caring for our roads and of raising our road funds are at least worthy of our most careful thought.

The road conditions of today in New Jersey and Massachusetts may not show the general problem. They are both old, thickly settled states, and they were pioneers in road improvement. But what road improvement has brought about in those states it will in a like way, if not to the same extent, also bring about elsewhere. In both of these states there is a motor registration of about four vehicles per mile of road, exclusive of city streets. In France this figure is about or a little less than four-tenths.

Evidently European experiences are not to be our final and only guide.

Let us therefore look at our problem for a moment without worrying about what others have done. The best way of doing the job is still an unsettled question. On whom shall we place the burden of arriving at the best method? Taking John Fritz's quip that "an engineer is the man who can do with one dollar what

any—fool can do with two," it is clear that that sort of an engineer is the man we want. Without a force properly drilled in the work, and properly organized to do it, efficiency, the getting for one dollar what with waste will cost us two, is impossible.

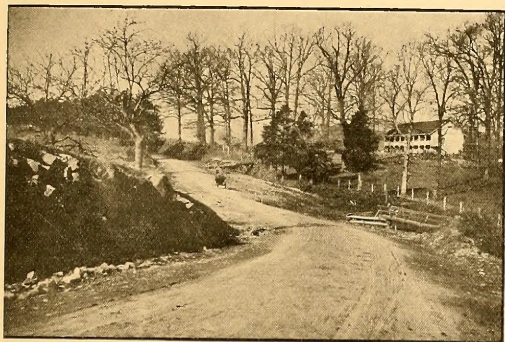
With such a force, money and time spent in careful preliminary study, in being sure we are right before we go ahead, will not be wasted. Once when in charge of a machine shop, I hired a new planer hand. Early in the game we had a set of small engine beds to plane. I gave the work, one-half to an old and tried hand, the other to my new man. The special job was new to both of them. The old hand started in to set a bed on his planer without much thought or study, he finished it and set the second in a slightly different way, and had the chips falling from it before my new man did anything but sit still looking at his tool and his castings with his chin in his hands and a look of abstraction on his face. I came near bouncing him then and there, but, on second thought, let him work it out. He had his half done in time to help my old hand out with a few of his castings. That hour or more that looked like a waste of time turned out to be a good investment. We have done, and are doing, our work too much in the way of my old and tried man. It is no wonder that roads designed and built without knowledge as to the traffic intensity on them should prove either too weak or more costly than necessary for their purpose. In both cases there is waste.

We need, first, a force that can lay out a well thought out plan with a fair chance to do so without political meddling. The cost can then be forecast. Changes in traffic may lead to change in general design and detail as happened at Panama, without making efficiency impossible. The same happens so often with even so simple a task as building a house, that the wise man always allows some margin on the first detailed estimate of cost. With the cost known, plans for raising money can be made for meeting it, and a program of construction arranged with a view of giving the earliest and greatest return for the money spent.

Bond issues and the "pay as you go" plan must be considered. It is evident that over any period for which bonds are issued, the tax levy must include interest and amortization charges on the bonds, as well as the cost of caring for the roads built, and to meet depreciation. If the same amount be raised each year by taxation, and used to meet road building, repair and depreciation charges, it is clear that the amount raised for interest and amortization, and, in the first part of the period, some of the amount raised for repair, etc., can be used for new work. The net result over the whole period is a reduced cost for a given mileage. Against this we have the use of the roads built for a longer average time. This benefit, will, in many cases, be cheap at the increased price, but only on the assumption that bonds are issued on some definite and business-like plan, and the proceeds wisely invested. This has not always been the case.

Any satisfactory road administration must provide for proper design. The data for this is not readily at hand. Traffic figures over an unimproved road bear no relation to the traffic to be expected after improvement. Even were satisfactory traffic data readily avail-

able, the economic values of different types of construction are unknown. Motor traffic for not over ten years has been a serious destroyer of road surfaces. It is increasing yearly in intensity. The surfaces specially designed to carry this troublesome and valuable load have not been in use long enough to determine their probable lives and cost of upkeep under the conditions of today. The cost of the road is a yearly one and must include depreciation, if the waste of road material is not made good every year. Therefore, it may well be cheaper to spend money in the repair of a cheap



On the Central Highway in Orange County, North Carolina, where it passes through Gen. Julian S. Carr's famous Oconeechee Farm

adequacy of their service, and as to their methods of financing, the people of this country have in no case insisted on such safeguards as to the work of those entrusted with their roads.

The engineering problems of railroading have been solved in their broad lines. We will probably be able, as in the past, to keep on increasing axle loads and reducing ton mile costs, but along lines indicated by carefully collected and thoroughly digested data of many years' work. This, as in the past, will be done by thoroughly trained and competent men knowing their business and eagerly looking for ways and means of getting better results.

With our highways problem we are now searching for the best solution. We have, generally speaking, inadequate and untrained or only partially trained forces. We have no accepted traffic unit and no gen-

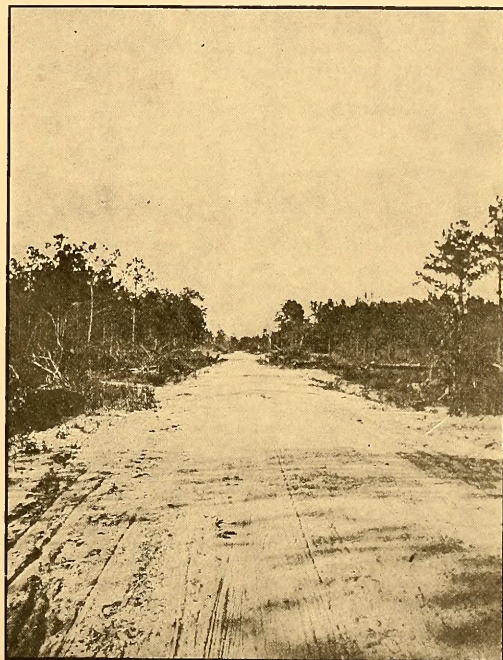
type, such as macadam or gravel, rather than to resurface with an expensive pavement whose life is at the best uncertain.

For example, a macadam road under heavy traffic may be maintained at about the following cost per square yard:

| | Cents |
|---|-------|
| Stone, say $\frac{1}{4}$ in. or 42 lbs. @ \$3.00 a ton rolled in place..... | 6.3 |
| Bituminous binder, say 3-8 gal. @ 15 cents, spread and covered..... | 5.6 |
| Ditches and drains, say..... | 1.0 |
| | 12.9 |

If an improved type of surface is laid on the old macadam at a cost of say \$1.25 a yard, the annual charge to be seen in the tax levy will for some years be merely the cost of ditch and drain work and a small amount to care for imperfections. The community might, however, have used the \$1.25 for new work, or might have left it with the taxpayer; in either case, it is costing the interest which at 4 per cent is 5 cents. We have then a saving of 6.9 cents, but it seems fair to assume that over a life of from 10 to 20 years we should allow at least 0.9 cent for repairs. Our saving is then 6 cents. We would have to realize this saving for about 21 years to get back our \$1.25 and if the new surface lasts less than that period it may well prove wasteful.

But any such figures are of academic interest only, unless we have the organized repair force needed to keep our roads in repair and a system of accounting that will give accurate data and that is based on an outlook over a period somewhat longer than that covered by next year's tax bill. On the basis of such a system and with such a force are our railroads operated. Their problem is of the same kind as ours—a matter of cheap and efficient transportation. It is perhaps curious that while the tendency of the day is to regulate these and other public service corporations as to the safety and



Sand Clay Road in Marion county, South Carolina

erally recognized system of accounting. These must be supplied if we are to solve our problem as it should be solved.

Macadam Road from Sapulpa to Springfield.

At a meeting of the Sapulpa, Okla., Commercial Club, held Nov. 30, plans were submitted for a macadamized highway from Sapulpa to Springfield. In the discussion of the proposed road improvement it developed that a strong sentiment exists for the project, and the matter will be taken up with Springfield commercial bodies and good roads organizations.

Such a road not only is feasible, it was declared, but its early completion will be a benefit to Sapulpa and to Springfield and to other cities along its route.

Brazos county, Texas, votes on the 30th of this month on a \$600,000 bond issue for roads.

The Road Materials of Tennessee

By A. H. PURDUE

THERE are three essentials for good roads. One is the money with which to construct them, another is the material out of which to make them, and the third is the engineer whose duty it is utilize the first two.

The duty assigned me in this conference is to discuss the road making materials of Tennessee. In preparing this brief paper, I shall assume that the engineers who are to appear on the program will inform you of the relative merits of the different kinds of rocks for road road building, and shall confine my attention to the kinds, quantity and distribution of rock in this state. What I shall say will be only of a general nature, because this is one of many things the Geological Survey of Tennessee has not yet been able to investigate and report upon, and because further, the limited time that I shall occupy would forbid detailed information, even if it had been accumulated.

At this point, I shall digress a little from the subject to say that the state geological survey wants to be of the greatest possible service to the public of Tennessee, and for that reason it is at all times ready to send one of its force along any proposed highway route to investigate and report upon the available road material, whether the road is to be constructed by a city, county, community, or the state.

Another way in which the geological survey can be of service is to aid in the location of roads. Engineering projects must encounter the geological element, which is always present, and which often supplies the greatest of all difficulties to meet. The determination of whether the site of a fill is firm or boggy; the amount and kinds of rock to be removed from a proposed cut; the dip of the rock beds; the probability of springs, seeps and slides; the nature of the soil upon which the road bed is to be built, the foundation of piers at a proposed bridge site—these and other geological questions constantly confront the road engineer, and make the advice of a geologist necessary to economy in construction and maintenance.

In the brief review of the road making material of Tennessee which follows, I have taken up the state by geographical divisions, beginning with the eastern part.

The mountains along the eastern border of the state consist mainly of sandstones and shales. Those rocks are highly tilted, and strike northeast and southwest with the ranges. Those roads that run parallel with the ridges, consequently with the strike of the rock beds, would have, within easy reach, several varieties of material. Those that follow the streams cutting through the ridges—those that run across the strike—would, within short distances pass over or through rocks of different kinds, and these would furnish a variety of material.

In the valley of east Tennessee, which lies between the above mentioned mountains and the Cumberland Plateau, the prevalent formation is the one known as the Knox dolomite. This consists mainly of limestone, is from 3,000 to 5,000 feet thick, lies in northeast-southwest belts extending across the state, and in the aggregate covers several thousand square miles. In most places, this formation is covered to the depth of several feet with soil, but there are numerous places on hillsides and in ravines where it is exposed, inviting use. Most of the beds are tough, but many of them are brittle. Parts of the limestone contain a great deal of chert, which is left as residual material on the knobs and hills.

This, mixed with the limestone, would make good road material, and could be easily removed from the fields, which would be much improved thereby.

Between the belts of Knox dolomite in the Valley of east Tennessee, there are others consisting mainly of limestone and shale. Some of these are marble, which as is well known to road engineers, is too fragile for the best road material. But so abundant and universally distributed is the good road material of this part of the state, that it is nowhere far to seek.

In several parts of the Valley of east Tennessee, and along the eastern escarpment of the Cumberland Plateau, there are deposits of iron ore. I have not seen many of these deposits, but doubtless associated with the beds of commercial value, there are others too inferior for pay ore, and these could be used, at least locally, as a binder.

The limestones in the Valley of east Tennessee pass under the Cumberland Plateau, and are there in most places overlain by sandstone and shale; but they are brought to the surface by the great fold, and erosion, in the Sequatchie Valley and Crab Orchard area. This area could be a source of limestone macadam on either side, as far as it could be hauled by wagons. Elsewhere over the Cumberland Plateau, which, on east-west lines, has a width of from 30 to 50 miles, the roads probably would have to be built of sandstone and shale.

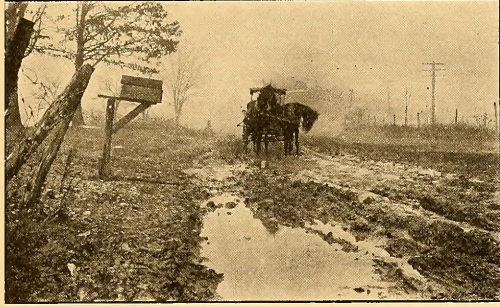
Middle Tennessee is made up of the Central Basin and the highlands surrounding it. The Central Basin is somewhat more than 50 miles wide in an east-west direction, and extends practically across the state north and south. The rocks of this basin are limestone, which for road building purposes, can easily be secured anywhere within the area.

The Highland Rim, both east and west of the Central Basin, is composed of limestone containing a great deal of chert. The surface of this area is covered with soil, which is residual material from the decay of the rocks, and which in many places contains so much chert as to interfere more or less with its cultivation. It would be an easy matter to improvise a horse rake by which these chert fragments could be brought together after which they could be loaded and hauled to the roads. Along many of the streams flowing down from the rim, there is gravel in unlimited quantity.

In Wayne and Hickman counties, on the western Highland Rim itself, there are in places on the tops of the hills, large quantities of quartz and chert gravel mixed with clay, that would make admirable road material. Certainly many of the streams of this area, and probably all of them, contain gravel in unlimited amount. I have not been over the counties north of these mentioned and east of the Tennessee River, but should confidently expect to find the same conditions there.

Immediately west of the Tennessee river, there is an outcropping siliceous formation running parallel with the river, known as the Camden chert. This deposit is quarried rather extensively at a point midway between the town of Camden and the Tennessee river, for road material. It consists of the weathered remains of the siliceous formation, and contains more or less clay, to which Ashley attributes its superior quality as road material. The distribution of the formation is thus described by Ashley: "The exact distribution of the rock, even in Tennessee, has not yet been worked out. At Camden it passes beneath the Ripley formation of Cre-

taceous age, about three-quarters of a mile west of town and extends east until lost in the bottoms of the Tennessee river. It has not been described on the east side of the river around Johnsonville, but doubtless occurs there, as it is found further to the northeast in the Well's Creek basin at Cumberland City in Houston and Stewart counties. From Camden, it extends north to the state line, thence across western Kentucky into southern Illinois. South of Camden, it is found to ex-



Bad section of road in Spottsylvania County, Virginia

tend into Decatur county, but how much further is not known."

In the large area of West Tennessee between the Camden chert and the Mississippi river, there are but few rocks as the term rock is commonly applied, the deposits of the area consisting for the most part of loose sand and gravel, the latter occurring along the streams. These materials consist of different formations of Cretaceous, Tertiary, and Recent ages. The gravels occur chiefly along the Tennessee river, though in all probability some of the small streams of the area would be a source of supply. Where gravel can not be obtained, the sand and clay could be mixed, for sand-clay roads. Most of the sand is fine to medium-grained, but in places there are very coarse-grained deposits.

It will be seen from the above that all parts of Tennessee, except the Cumberland Plateau and parts of west Tennessee, have an inexhaustible supply of good road material right at hand, and even in the less favored parts, the material is conveniently available for fairly good roads, if properly treated.

George Gordon Battle on Convict Labor.

"The convicts working on the roads in Iowa have a status differing from that of the convicts in the prisons of practically all other states," said George Gordon Battle, the distinguished New York attorney who appeared on behalf of the national committee on prisons and prison labor in a suit to test the constitutionality of the contract system of convict labor in the state of Rhode Island.

"In Iowa the men working on the roads receive \$2.50 per day for their labor, they themselves paying for their keep and clothing and being at liberty to send the balance to their dependent families. They are still under restriction, but their right to wage lifts them out of the slavery status into that of state wards.

"The condition of these Iowa convicts is in sharp contrast to that of the prisoners in Rhode Island. In the latter state the labor of at least 250 of the prisoners is let by contract to a firm of shirt manufacturers. The state supplies the factory room, light, heat, and power necessary, and pays for transportation of materials and manufactured articles from and to the rail-

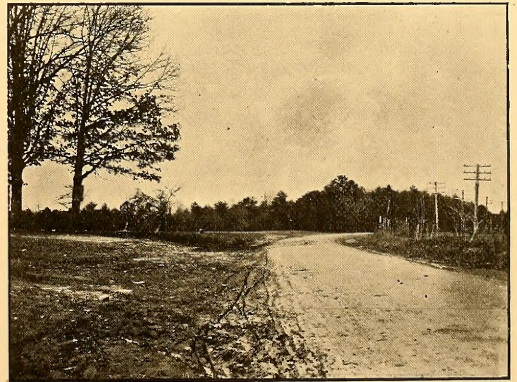
road station. The contractor supplies the machinery, material, and supervision necessary to keep these prisoners employed, and pays the state 50 cents for each dozen shirts manufactured. The prisoner is forced to labor under the terms of this contract and receives no wage for his labor.

"The National Committee on Prisons and Prison Labor contends that the condition of the prisoners working under this and every other prison contract is slavery; careful study proves it analogous to the condition of the negro slave before the civil war, and in accord with slavery as defined by the supreme court of the United States.

"Slavery is prohibited by the constitution of the state of Rhode Island without the exception as to punishment for crime found in the federal and most of the state constitutions. The committee therefore claims that the statute authorizing the state board of supply and control to let the labor of the prisoner by contract is in conflict with the state constitution, and the contract therefore illegal.

"To secure an opinion from the courts, the committee is backing an ex-prisoner in his suit against the prison contractors for wage for his labor while in prison. The committee hopes through this case to forward the movement for the abolition of the contract system of convict labor, not only in the state of Rhode Island but throughout the country, and also to show the right of the convict to receive a fair wage for his labor, through which he can contribute towards the support of his dependent family.

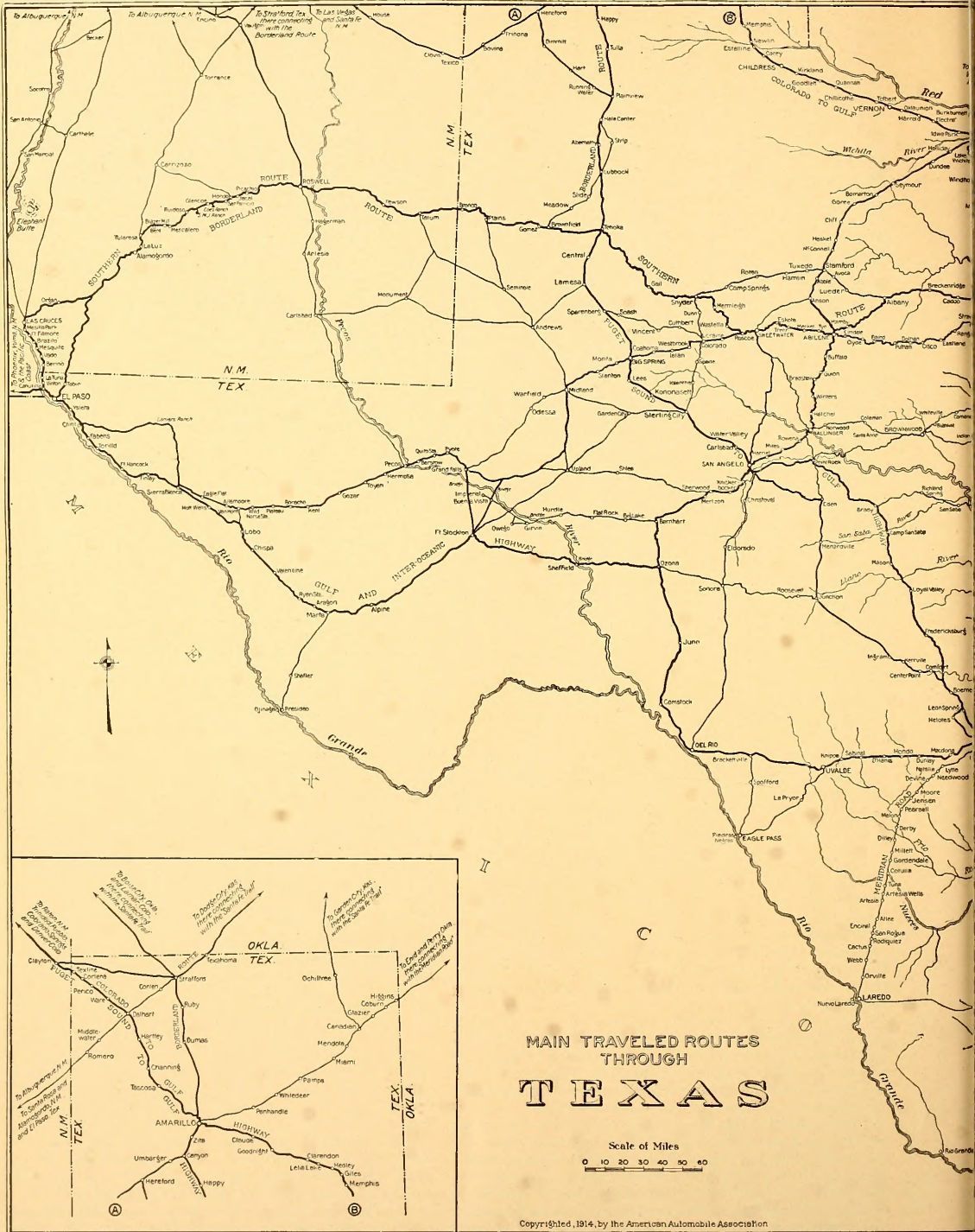
"The action of many states in placing those prisoners who can be trusted out to work on the roads is in line with this forward movement. On the roads the prisoner can do work which has value great enough to permit the payment of the wage. Iowa has proved the



Same Spottsylvania county highway, after improvement
Photo by U. S. Office of Public Roads

plan practical; West Virginia, New Jersey, and other states are successfully passing through the experimental stage, while many more states will enact legislation permitting such work during the coming sessions of the legislature.

"The National Committee on Prisons and Prison Labor," Mr. Battle concluded, "stands firmly behind this road work, when it is conducted under conditions fair to the prisoner and the free workingman, and hopes in the next few years to see 'honor men' making good roads everywhere throughout the country."



ROUTES ACROSS TEXAS.

The publication of the accompanying map by the Touring Department of the American Automobile Association now affords the motor tourist an opportunity to cross the Lone Star State over roads which have been properly mapped. Hitherto, touring across Texas has been a haphazard proposition to the tourist, and he has had to travel, like Columbus, across the uncharted vastness of this, the largest State in the Union.

The map shows two well defined lines east and west across the State. Both of these lines have been surveyed by properly appointed pathfinders of the touring department. The southern route, which is shown here for the first time, was surveyed by E. L. Ferguson, for many years the official starter of the Glidden Tours, Munsey Tours, New York Herald and Atlanta Journal National Highway Tours. Mr. Ferguson surveyed and published the first "All Southern Tour Across the Continent."

Speaking of this route, he says: "Touring across Texas by those who enter the State either at Orange or Galveston, presents the value of traveling a continuous improved road all the way to Dallas. By the end of 1914, several million dollars voted by the counties along that area will have completed the large gaps heretofore existing.

Two Big Swamps Eliminated.

"The eastern half of the State presents conditions varying from modern roads to fair roads, and here and there stretches poorly maintained. Twenty per cent of this section would be unaffected under any weather conditions. Forty per cent would only be had to follow after several days' rain. The remainder is bad going after one day's rain, but has the quality of becoming good again in another day, partly due to dragging and partly to the peculiar water shed conditions.

"Entering Texas, two big hitherto impassable swamps, Sabine at Orange and the Neches at Beaumont, are now crossed by ferry; but bridges are to be completed as part of the road plans and appropriations.

"Houston is the junction point for either the Orange or Galveston entrance. North from Houston the continuous modern highway to Dallas goes through Hempstead, Mavazota, Bryan, Bremond, Groesbeck, Corsicana, and Waxahachie. West from Dallas, a new and modern road continues, which Fort Worth is the center. Good roads continue to Weatherford, and about Mineral Wells much construction has taken place in the past two years. At Palo Pinto a turn is made to the south and west that the tourist may be in constant touch with the railroad along which are points that offer every touring facility.

Garage and Hotel Facilities.

"Along this entire stretch from Palo Pinto to Abilene the roads are kept well dragged and graded by a very active good roads association. From Abilene to St. Angelo the same conditions continue, paralleling the railroad and frequent towns, with this southward trunk line of macadam constantly improving the going.

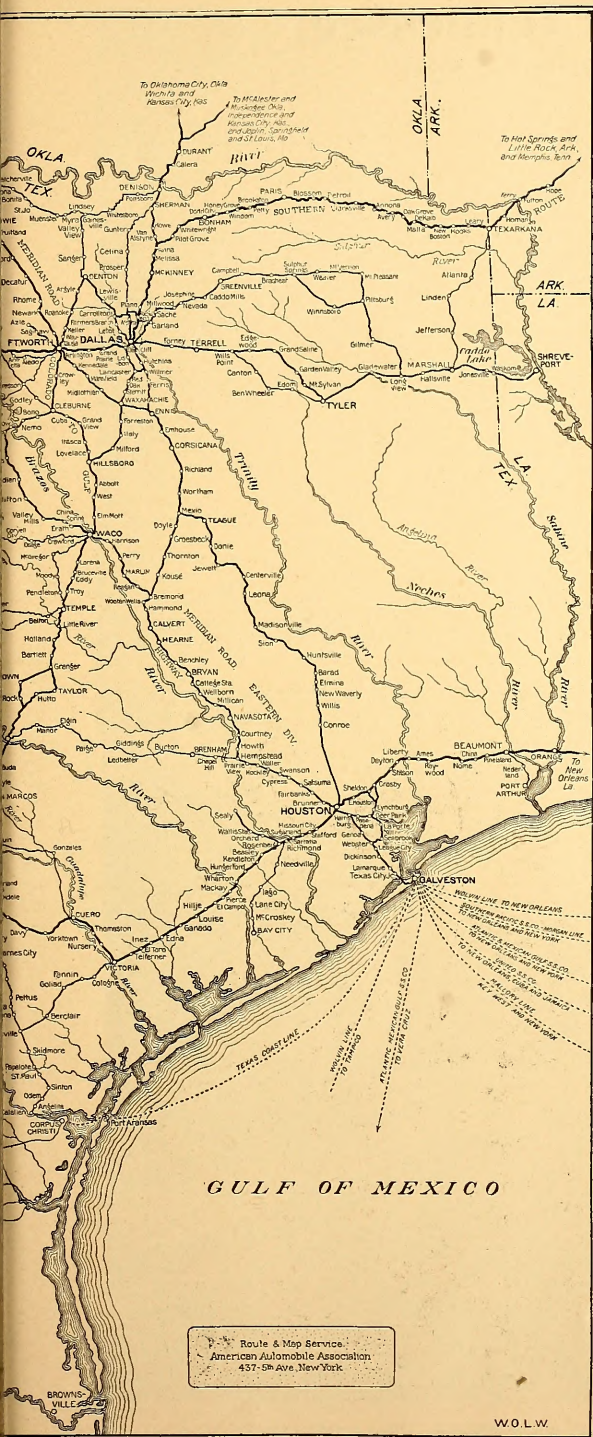
"From St. Angelo to Fort Stockton the road follows the railroad to Barnhart. From Fort Stockton the road follows largely with the railroad, but there are no settlements until Alpine is reached. Throughout the entire way across Texas the only points where the tourists are away from towns, hotels, and garages are the short runs from Sheffield to Fort Stockton, from Fort Stockton to Alpine, and from Sierra Blanca to Clint."

Roads Surprisingly Good.

Referring to the more northern route, W. O. L. Westgard states: "The route from El Paso to Texarkana, through Alamogordo and Roswell, N. M., Bronco, Sweetwater, Fort Worth and Dallas, is along much higher altitude than any of the more southern lines, and is, therefore, more comfortable traveling in hot weather. It also has surprisingly good roads for the greater party of the way.

"Despite the occasional bad stretches on this run of 994.2 miles across Texas from the Rio Grande to the Red River, it is one of the most interesting and instructive trips of its length in the United States."

North and south, the Meridian Road, which has its beginning at Winnipeg, Canada, is shown passing through Fort Worth, Waco and Houston to Galveston. A vast amount of work has been done on this road, and for a considerable distance the roads are dragged after heavy rains. From Waco to San Antonio is the western division of this road, and the perspective line to La Rede is also noted.



State Aid for Tennessee

By T. F. PECK, State Geologist

TENNESSEANS are waking up to the value of good roads, and many miles of roads have been built—some graded dirt roads, some macadamized roads, but very little concrete road. The one important item of legislation the farmers of Tennessee should urge the next legislature to enact is a law for maintaining our public roads in the state. We need, and should have a state highway department. With many good roads are a luxury; with the farmer they are a necessity. However, if roads are not maintained, if they are not kept in repair, the land prices will not advance further, and they may go back. It is the problem of maintenance that is injuring the cause of good roads in a great many communities.

We are beginning to wake up to road needs and spend money to supply them. But we are not showing an equal willingness to keep the roads in shape after we get them, and when we do fail in this respect the whole movement for good roads suffers. Last year there was spent in the United States the very respectable sum of \$206,000,000 for the building of public roads. This includes the money spent by the federal government, the states, counties, townships and road districts. At the present time forty-two out of forty-eight states have state highway departments. Ten years ago there were but fifteen states where good roads were considered important enough to be looked after by a state bureau.

Right now it is estimated that about 10 per cent. of the two million miles and more of American highways may be classified as "improved roads." More than two million miles are yet unimproved, but we have made an effective beginning.

That part of the battle for hard roads is pretty well over. The value of the right kind of a road is now acknowledged, but this does not mean that all opposition has vanished. The old bugaboo of increased taxation stands like the Giant Despair in the path of many communities where the need is admitted. And every time a stretch of really improved highway is permitted to go down and become impassable in places this opposition gains growth. In nearly every state the system of building is fairly good, where a road is bonded and built it is usually in an approved manner. It is the system of maintenance that is a shame and a disgrace. We have yet to learn that when a road is built it is not built to stand through time and eternity. Experts may build them, but unless they are looked after by men with some knowledge of how they must be maintained their life is short.

Build the roads right and work out a system of maintenance and there will be a vast saving. This will result in a reduction of taxes and will make the burden of road financing one that can be carried far more willingly. The thing that really scares most of us is not the increased taxation for a few years, but



Bad Road at Poplar Springs, Miss., Before Improvement Under the Supervision of an Engineer of the U. S. Office of Public Roads



Fine Road at Poplar Springs, Miss., Which Replaced One of the Worst Roads in Mississippi

the prospect of having to go through with the same burden again in a few years when the roads have been allowed to go to pieces.

We seem to take it for granted that a good road will last forever when once laid. So we pay little, if any, attention to it. In a short time the first ruts are making their appearance. If it is a graveled or a macadam road the passing automobiles will strip it of its skin. If it is a concreted highway the break-up will be slower, but just as certain. On the average road the holes and ruts begin to gather water that stands there till it soaks through into the roadbed. This softens and helps to wear away the surface and in a few years the highway is in nearly as bad shape as it was before it was improved.

State aid is one of the things that help to put an end to this building of roads and letting them go to pieces. When each county or district builds just as it pleases the trained engineer has very little chance. Under state aid the state highway engineer has not only the supervision of the road building, but he can exercise the authority of the state in the matter of maintenance.

As soon as we get it out of our heads that the mere election of a man to the office of road overseer, highway commissioner or road supervisor makes him an expert in road-building, the better off we are going to be. Many millions of dollars are wasted each year through permitting some man who wanted the office and got it, to direct the building and maintenance of roads. If the day ever comes when the remaining 90 per cent. of the roads of the United States are improved, it will be after we have got rid of this way of supervising the

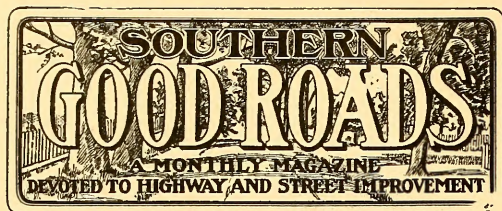
roads. In some states this is worked out by the appointment of a county highway engineer with power of supervision over road overseers in the county.

Millions For Road Work.

Michigan has appropriated \$4,183,972 for good roads during 1914 and stands fifth in the roll of the states setting aside money for road work. Compilation made by the American Highway association and transmitted to Secretary George F. Balloon of the Associated Roads Organization of Chicago shows that twenty-five of the states have appropriated a total of \$62,201,016, and Iowa leads the states with \$7,310,000 set aside, while New York state comes second with \$6,000,000, Minnesota third with \$5,672,254, North Carolina fourth with \$5,000,000 and Michigan fifth with \$4,183,972.

The state of Maryland has set aside \$3,700,000 and Ohio \$3,500,000, while Pennsylvania has set aside \$3,500,000 also. Other states that have made noteworthy appropriations include Oregon, \$3,280,000; Massachusetts, \$2,440,315; West Virginia, \$2,286,000; North Dakota, \$2,365,000; Virginia, \$2,000,000; Mississippi, \$1,720,000; Illinois, \$1,300,000, and others, including New Jersey, Alabama, Arizona, New Mexico, Colorado, Idaho, Wisconsin, Delaware and Kentucky, less than \$1,000,000. The last named state has set aside but \$25,000 for road work.

The postoffice department has become intimately identified with the good roads movement through the fact that it employs 43,000 rural free delivery carriers, and these carriers travel a total of about 300,000 miles daily.



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Official Organ Southern Appalachian Good Roads Association

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Official Organ of the Virginia Road Builders' Association

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VOL. X. DECEMBER, 1914. No. 6.

ROAD LEGISLATION.

For years we have been urging good roads advocates to get together and formulate plans for systematic campaigns before the legislative bodies of the land, as the annual or biennial sessions draw nigh. Experience has shown that sporadic effort, desultory firing here and there, "sniping"—to use a phrase made popular in recent war stories, never accomplish anything. It matters not how much energy and enthusiasm is back of this legislative sniping, results are few and far between.

As we have pointed out frequently, the proper time to get next a legislator is when he is a candidate but nine voters out of every ten lose what little common-sense they possess during election times and if a candidate wears the "right" political collar, they vote for him, no matter what sort of animal he is. They forget roads, schools, religion—everything except the prejudices that were born in them and bred into them and they vote as those prejudices direct.

No, legislators are not chosen because of their position on vital questions—at least, not in this country. They are chosen to legislate on state questions and county and neighborhood questions, because they subscribe to certain tenets of party as to the tariff, trusts, monopolies, and questions of national military, naval, and merchant marine policy.

"Since these things are so," as old Cicero used to say when lambasting Cataline before the Roman senate—it does seem that it is waste of energy to try to induce voters to change their ways of choosing men for whom to vote. Except in the case of the despised "floater," about 95 voters out of every hundred in this southland of ours, like the famous Billy Goat in Governor Bob Glenn's animal convention, have "done voted" as soon as their party nominee is selected.

But the people in their blindness select mighty good men some times. In fact, the average Southern legislature is made up of good men, for the most part. The only fault we have to find is that they play politics all the time, even when their best judgment tells them that they are taking wrong course.

Every measure, no matter how meritorious, no matter how much it means to the state, must be measured by the political yard-stick. They never ask "Is it best for the state?" That concerns them, in a way, but the big question all the time is, "Is it best for the party?"

But, laying all that aside, there is much that can be done if you go at it right. Every legislature in the south should be tackled in the right way at the approaching sessions, concerning road legislation. The road laws of practically every state in the south need overhauling and need it bad. Several states, among them North Carolina, need state highway departments with sufficient funds back of them to do some real good. How are the many needed reforms to be secured?

Certainly not by sniping. There must be united, aggressive effort all along the line. State good roads associations must name their best men, their most tactful and diplomatic members, on legislative committees and these committees must get busy and stay busy. Get in touch with the members of the associations, the privates in the ranks, and let the legislators hear from the "boys."

We hope to see great things accomplished by legislative enactment in the Southern states in 1915 and we urge all friends of the good roads cause, to do all in their power to secure the good roads legislation needed in their states and to secure it in 1915.

STATE ROAD SCHOOLS.

We are glad to see that the movement for schools for training of county and township road authorities is spreading. It is worth while. As this is written the State Highway Department of West Virginia and the engineering department of the University of West Virginia are holding a good roads school at Morgantown. In this issue a similar school is announced for Tennessee, to be held early in 1915, and another for Kentucky. In several other states schools will be held in the late winter, or early spring, before the road-building season sets in.

Wherever tried these schools have been immensely successful. Road supervisors, overseers and foremen, as well as county engineers of the college trained variety, have secured new ideas and have gone back to their work much better road men. The schools rare-

ly last over 30 days and it is not possible to make a finished road engineer out of a man in that time, but a bright man can pick up a thousand new ideas, all of which can be turned into money for his county, township, or road district.

These schools do not cost a great deal. Nearly every state in the south could conduct one at small expense, for they all have state colleges with schools of engineering, headed by high class engineers and most of the Southern states now have state highway engineers well equipped for this very kind of work. The schools can be held at a time when road-building activity is at its lowest ebb and road officials have least to do.

THE ATLANTA CONVENTION.

The gathering of the good roads hosts at Atlanta last month was worth travelling many hundreds of miles to see. More than 3,000 earnest, able men gathered together from all parts of the continent to consider questions relating to the construction of highways, their upkeep, methods of financing, etc.

The Road Congress was all that the promoters promised and a great deal more than anybody expected. The lessons learned there by highway officials from every state in the nation, will do untold good.

Failure of Road Bond Issues.

Instances are not lacking, according to the road-building specialists of the Department of Agriculture, where bond issues for highway purposes have proved failures. These failures, the government experts say, are invariably due to mismanagement rather than to defective principle. Where counties have issued highway bonds the proceeds of which have been spent to construct temporary road surfaces on unimproved grades and without proper drainage, failure has necessarily resulted. There are on record in the Office of Public Roads instances where so-called macadam roads have been built with bond money by simply dumping broken stone at the wrong time of year on muddy road surfaces without grades or alignments and without rolling or binding.

A typical method of mismanagement is to distribute the funds equally on all the roads in the county or district issuing the bonds. Recently in a southern state \$40,000 was distributed equally over nearly 90 miles of highway in a certain district. After deducting necessary overhead expenses this sum was equivalent to about \$400 per mile. Obviously no permanent results could be obtained from such a distribution. In another county, where heavy rains and severe winters could not fail to make the roads nearly impassable with the superficial construction adopted, bonds were issued to the amount of \$300,000. The money was devoted to light grading on an excessive mileage without any attempt at surfacing.

Through a misunderstanding of the essential principles underlying the establishment of a proper county road system, conflicts of interest sometimes arise which cause the failure of the bond issue plan. The location of the roads to be improved should not be determined by argument, but upon sound engineering and economic principles. Before a community votes to issue bonds for highways it is necessary to understand thoroughly what roads are to be improved, and the approximate

cost of their construction and maintenance. Too frequently ill-advised locations are adopted.

Highway plans for bond issues require expert skill and professional service. Before the amount of bonds is determined, a thorough study of the needs of the county should be made and careful maps of the proposed highway system should be prepared. The sum to be issued should not be fixed until it is reasonably known what it will accomplish. It is customary for many counties to appoint a commission of business men under whose jurisdiction the bond money is expended. In other cases the county supervisor or county commissioner has the direction of expenditures. The best results have always followed where such commissions or county boards have secured the services of a highway engineer.

Guided by the costly experience of many communities, it is now becoming common for counties to adopt this plan. In all engineering construction it is customary to allow a certain percentage of the cost for engineering and supervision. There is no reason why highway building should be made an exception to this rule. At least 5 per cent of the bond issue may well be set aside for engineering and supervision alone. Money spent to hire a competent engineer to make preliminary investigations before bonds are issued and to plan and supervise construction will be well spent. It is not uncommon to find counties that will repeatedly postpone the sale of bonds in order to obtain an increase of 1 per cent in a bid for \$100,000 or less and then proceed to construct the roads in a most haphazard and ill-planned manner.

State Highway Engineers' Association to Meet in Chicago.

Mr. A. R. Hirst, state highway engineer of Wisconsin, president of the State Highway Engineers' Association, has written Dr. Joseph Hyde Pratt concerning the approaching meeting of that organization, as follows:

The State Highway Engineers' Association has usually held its annual meeting in January or February of each year. The meeting is always held at Chicago, and is customarily for two days.

In view of the fact that the American Road Builders' Association meets at Chicago this year December 15th to 18th inclusive, it has been suggested that the meeting of the State Highway Engineers' Association be called at Chicago for the same week.

We believe it especially advisable to so arrange, if possible, due to the fact that in most states there is a meeting of the legislature commencing in January, and the principal members of the highway departments in those states would probably prefer not to leave the state during the early days of the session.

The principal attraction of our association's meetings has been that an opportunity is given for free and open discussion, without publicity, of the larger and more important phases of the work of a state highway department, such as legislative policy, patents and patented materials, advisability of various pavements, etc. etc. Those engineers who have attended the meetings of the State Highway Engineers' Association have repeatedly expressed themselves to the effect that these meetings are the most valuable of any of the conventions they attend.

If the meeting is held in December as suggested, it would probably be best to hold it on Monday, December 14th and Tuesday, December 15th. On Monday the larger convention has no sessions and on Tuesday it is confined to addresses of welcome, etc., which most of us can bear to miss.

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Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE
THE MOST EFFICIENT METHODS AND APPLIANCES
FOR ROAD BUILDING AND MAINTENANCE.

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Forest Depot, Va.

C. B. Scott
Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary



ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

Virginia's Good Roads.

From the new town of Alberta, Virginia, comes the welcome news that D. H. Winslow, United States superintendent of road construction between Petersburg, Va., and Fayetteville, N. C., on the national highway running from New York to Tampa, is making preliminary improvements through Dinwiddie and Brunswick counties, and that the result of his work is very satisfactory and encouraging to the people throughout the counties which this road traverses. The people can see from the amount of work done that the salvation of our sand-clay roads, is proper maintenance by expert engineering.

Mr. Winslow has patrolmen all along the line, who give their entire time to cleaning out the culverts, ditches, cutting away brush, repairing bridges, harrowing and dragging the roads as per his instructions. These men make a daily report to him of the amount of work done and the class of work and the cost. Thus he readily makes notes on his map, which shows the progress being made each day along the entire line. One of the instructions to these patrolmen is, "Receive all information and criticism from the general public in a courteous manner."

Mr. Winslow is working in close co-operation with the farmer and people in general all through his divisions, and his mission is to be to the people in the main a community engineer as well as road engineer. He expects to take up with the children in the near future the establishment of athletic fields and grounds, such as baseball, basketball, tennis, etc., along this highway, and to beautify the yards in their homes.

The general sentiment with the people along this road and throughout the counties, is that the government's purpose is to build roads. This is not true. The purpose and work of the government is to maintain the road to its highest efficiency, and to educate the people along the proper methods in which sand-clay roads should be worked to get the greatest amount of good from them.

There are 266 miles of road now under the government supervision, and as soon as Chesterfield county comes in this division will be completed in mileage. Mr. Winslow finds that the supervisors all along this road are becoming more encouraged over his work, and are now coming to his rescue in building this road and carrying out other improvements. He is now more convinced that this road traverses some of the finest farm lands in the south, and there is a great future in store for the counties through which the national road passes.

Good Roads in Lunenburg.

Lunenburg county is generally dubbed the "Free State," owing to the independent spirit of its earlier settlers, and it is also known as the first county in Virginia where the secession propaganda spread without let or hindrance. Of course its swords have long since been beaten into plowshares and its farmers are now the most industrious in the Old Dominion. They are forward in all good works; this is evidenced in a pleasing way to the progressive element in the carrying of the bond issues in both Lewiston and Lochleven Districts, by a three to one majority for road improvement. Columbian Grove District will submit the question of good roads to the voters of that magisterial district in February, and it goes without saying, that the issue will be carried. There is only one district in the county where the road movement has met with defeat at the hands of the voters, and it is generally accepted that the time is ripe for again placing the question before them for arbitrament. Less than a decade ago Lunenburg could boast of a railroad that barely touched one edge of the county, but to-day, with the advent of the Virginian Railway, running through the heart of the best agricultural section, the added stimulus of this splendid service has become contagious. Improved roads now radiate from Kenbridge to all sections of the county, and the mileage planned and two-thirds completed will total about 200 miles. Thus it can be readily seen that the process of eliminating the opposition of the disgruntled element as factors in the path of Lunenburg's progress is reduced to a minimum. Again, the monetary value of well located farms has been steadily on the increase, and during the present year twenty or more families from other sections of the state have bought land adjacent to Kenbridge, and at a value that will offset the entire amount expended for this important work. Lunenburg has blazed the way for a great future, and less progressive counties can follow her example with profit. Lunenburg county bids fair to be one of the banner counties in the state for good roads. For three years the road fever has been very active, and seems to grow and spread intensely. The roads already built have stimulated interest in every district.

At the recent term of the circuit court in this county, Lochleven and Lewiston districts both petitioned the court to call elections to determine whether they should issue bonds for road improvement. From the present outlook there is not the slightest doubt that the people in these districts will vote for the bond issue. Both districts are composed of progressive people who

appreciate the manifold advantages of good roads, and they are going to rid themselves of mud and the mud tax.

This leaves Columbian Grove and Pleasant Grove districts the only sections in Lunenburg county, where the good road movement has shown no results. Pleasant Grove is agitating the matter.

What this county has done other counties can do. Not a man who has experienced the pleasure of traveling over good roads would go back to the old system. The good roads movement is about the best thing that ever struck this old county.

Boone Way Project Prospers.

Mr. James Maret, of Mt. Vernon, Ky., well known to readers of Southern Good Roads on account of his good work for the Boone Way, a proposed highway along the trail followed by Daniel Boone from North

penses of publicity. The Courier-Journal is especially commended for its great assistance and Southeastern Kentucky is learning that Louisville, its papers and wholesale merchants are people with whom reciprocity should be practiced.

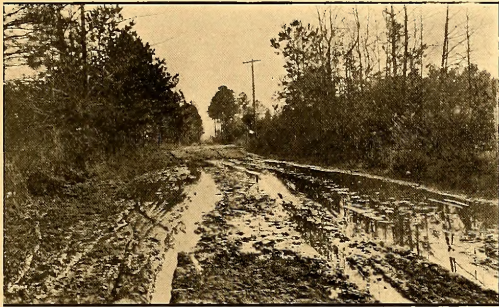
"The tour of the good roads men developed the fact Southeastern Kentucky appreciates Louisville's efforts to assist in every possible way in pushing the Boone Way through and will not forget that city's travelling salesmen when coming through this territory, especially if they are wearing the "Boone Way Booster" button, which they procure from the secretary of the Boone War Booster Band, Mt. Vernon."

Valuable Reports on Convict Labor.

The Commission to Revise the Road Laws of Ohio, appointed by the last legislature, has under consideration the advisability of recommending to the next session of that body, that convicts be employed upon the public roads.

The national committee on prisons and prison labor, and the graduate highway department of Columbia University, filed with this commission reports as to the success of convict road work in Iowa, New Jersey, West Virginia and the western states. From these reports the commissioners realized the possibilities in this sort of labor both for the Ohio convicts and Ohio roads, and the chairman of the commission, Senator Hudson, and Messrs. Smith, Sharrack and Shorer, journeyed to New York for consultation with the committee.

A conference was held, in which Prof. Blanchard, director of the graduate highway department of Columbia University, took part. The road and prison experts recommended a state highway department, responsible for all the road work in the state, requisition



Bad piece of road near Petersburg, Va., before improvement

Carolina to Kentucky, has recently been out prospecting along the road in the interests of the Kentucky Good Roads Association. Concerning his experiences he says:

"One week's tour over the route of the proposed location of this, the greatest proposed highway between the north and the southeastern portions of our country, the connecting link, shows that each of the counties of Lincoln, Rockcastle, Laurel, Knox and Bell not only indorse the idea but propose to place themselves in the position to take advantage of the state aid proposition. Some of these counties propose a bond issue and claim that they will surely put it over. The bond issue appears to be the best and most logical way, but as mentioned each county works out its own plan and ideas for raising the necessary revenue to meet the stateaid proposition. This campaign trip demonstrates that the Boone Way is a go.

"Membership in the Kentucky Good Roads' Association was eagerly sought by business and professional men along the route when the purposes of that organization were explained, which are simply to instruct the various counties to take advantage of the opportunity to get state aid and to go to work for better roads, schools and churches, which quickly for follow in the wake of improved highways. All the counties mentioned above are now enthusiastic on the road subject and their workers are in the fight with full determination of pushing Boone Way on to Cumberland Gap.

"It is gratifying to note the great appreciation southeastern Kentucky is expressing for the stand the Louisville papers are taking in this Boone Way movement not only by space given in their columns, but cash donation in increasing the fund for paying ex-



Same road near Petersburg, after improvement under the direction of the United States Office of Public Roads

to be made of the prison department for such convicts as could with advantage be employed on the roads. The prison department, it was pointed out, should remain responsible for the proper housing, feeding, and other care of the prisoners. This system of co-operation between the road and prison departments is working most successfully in West Virginia, where Governor Hatfield, after conference with the national committee on prisons and prison labor, fathered the legislation necessary for its establishment.

The Ohio Commissioners are satisfied with the results already obtained by this system, and will probably recommend its installation in Ohio.

North Carolina Good Roads Association

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OBJECT: To promote the proper location, construction and maintenance of roads so that every road in North Carolina will be a GOOD ROAD 365 days in the year

This paper will be devoted each month to the interests of the North Carolina Good Roads Association. Contributions solicited. Copy for this paper should be sent to MISS H. M. BERRY, Editor, CHAPEL HILL, N. C.

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D. Tucker Brown, director of the North Carolina Good Roads' association, who has been spending some time in Western North Carolina in the interest of the Asheville-Murphy-Atlanta highway, was a visitor at Asheville recently and at the board of trade rooms he talked in an interesting manner to a representative of the Asheville Citizen, of the progress which has been made and the prospects for the future. He stated that the vice presidents for the counties in the recently formed road organization have been named as follows: Cherokee, J. Q. Barker, of Andrews; Macon, Dr. F. I. Siler, of Franklin; Swain, A. S. Patterson, of Bryson City; Jackson, Coleman Cowan, of Sylva; Haywood, Frank Miller, of Waynesville; Buncombe, N. Buckner, of Asheville.

These vice presidents will have charge of the work on the links of the road in the counties which they represent, and the indications are that the organization will be able to do a great deal of good, Mr. Brown stated. The latter is enthusiastic over the prospects for the construction of the important road and states that the people of this section of the state are greatly interested in the movement to connect the Georgia capital with the metropolis of the Land of the Sky with an excellent highway by way of Murphy.

Buncombe county has built all of its part of the road, the link in Buncombe being sixteen miles in length. That portion of the highway lying in Haywood county is twenty-seven miles in length and of this road, twenty-four miles have been completed. In Jackson county there is 20 miles of the road and 5 miles have been completed. Swain county has built no part of its 21 miles of the road, while but two miles of the road of twenty-four miles in length in Macon county have been finished. Cherokee county has twenty-eight miles of the road with eight miles constructed. These figures show just what has been accomplished between Asheville and Murphy. Mr. Brown states that there appears to be no opposition to the movement and expects that those counties which have done but little work will begin to build their links of the road at an early date.

In addition to the commercial value of the road to the Land of the Sky, it is stated that the highway will be one of unusual scenic grandeur if constructed along the route proposed. Western North Carolina already is becoming famous for her scenic highways and they are drawing many visitors to this section of the state during the summer months of each year. With the Asheville-Murphy-Atlanta road in condition for travel it is believed that thousands of visitors would be brought to this section of the state each year from

Georgia cities and other points in the southern states who are now spending their summers elsewhere.

* * *

The meeting of the American Road Congress in Atlanta attracted wide-spread notoriety, chiefly by reason of the wonderful strides which this section of the country has achieved within recent years. Not to be forgotten, Charlotte and Mecklenburg county came in for their share, chiefly at the hands of President Fairfax Harrison of the Southern Railway, who took occasion, in connection with his address on the supreme need of building good roads to connect the farmer with his nearest market or shipping point, held up Charlotte and Mecklenburg county as an example of the vast accruing benefits from such an arrangement.

Rev. S. M. Johnson of Roswell, N. M., who attended the road congress, arrived in Charlotte immediately after the close of the congress to spend several days and in connection with the meeting, had the following to say to a Charlotte Observer man:

"The people of Charlotte and the county commissioners and people of Mecklenburg county are to be congratulated upon the extensive and valuable publicity given to the town and county at the American Road Congress at Atlanta. Mr. Fairfax Harrison, president of the Southern Railway, gave an address at the convention last Wednesday in which he urged the importance of improving the road from the farm and plantation to the nearest market or shipping point. In order to drive home his point he instanced Mecklenburg county North Carolina. Years ago, he said the county planned roads radiating, like the spokes of a wheel, from Charlotte to the borders of the county and year by year continued to hard-surface these roads. Year by year the assessable wealth, farm values and population had increased. President Harrison said he did not know of a parallel to the marvelous growth of the town and county during the past 15 years. While there were other contributing causes, he attributed this astonishing progress in large part to the betterment of the county roads. The following day, another speaker recalled that about 1870 Capt. T. L. Vail, for 30 years chairman of the board of commissioners of Mecklenburg county, had planned that system of roads and used the convicts to build the first mile of the system, southeast from the city limits along Providence road; and that that mile was the first mile of macadam laid in Dixie, south of the Mason and Dixon's line."

Paris, Tex., votes on a bond issue of \$100,000 for streets on Dec. 29.

Good Roads Movement in North Carolina

By M. V. RICHARDS

Land and Industrial Agent Southern Railway Company

I AM not tempted to regret that for years the interests I represent have given considerable thought to the subject of public roads, not only in North Carolina, but in every state reached by the lines of the Southern Railway system. The railroads will be found among the leaders of all commendable movements for the betterment of internal improvements. The Southern Railway Company has co-operated with the people of the South in stimulating increased interest in the construction of public highways.

One likes to see the country grow and the people advance. North Carolina has certainly made considerable progress in the upbuilding of the public highways in the state. North Carolina has even set an example in road building which has been discussed and followed in many other states. I refer to Mecklenburg County; what that county accomplished has been portrayed in speeches at public road meetings throughout the United States. I have attended meetings in the North and West and you can well imagine the pleasure it afforded me to hear speakers hold up the North Carolina county's record in road building as worthy of special notice. There could, however, have been more roads built and improved in North Carolina and the state benefited thereby. We should be thankful that headway has been made, and should continue our efforts to further progress.

Some sections do not show much development in comparison with others; and those sections are clearly recognized as being backward in public highway building. Each citizen should take an interest—a moral and financial interest—in the work. When I am through my work on earth, may it be said, "He was at all times an advocate of good public roads and in his humble capacity did what he could to build up and not tear down."

The South is seriously interested in the public roads question. I believe the people of the South will sustain their reputation for meeting and solving the many economic problems which arise, and when they give the public roads due consideration, the South will possess the best roads in America.

A recapitulation of what has been accomplished throughout North Carolina in the development of commerce, industry, agriculture and education, under adverse conditions, would appear a revelation to many. Patience, sacrifice and abnormal hard work has brought your state great credit. May the people of North Carolina unite and determine to lead in the construction of public highways; may your enthusiasm not cease until this commonwealth stands at the head of the list. You have more to work with now than in days past, and larger should be your returns hereafter. As I travel through your grand state and meet with your good people, I especially observe and am gratified to see the universal hopefulness which exists. You have done, and are doing, great things, and are bent upon accomplishing greater things for your state and country.

The right spirit is in the hearts of the people of the South. When people think right and work right, the maximum measure of success is assured. I believe we have come to understand the fundamental principles which must be recognized if advancement and

prosperity is to be ours. Self-government, self-support and self-defense are underlying factors in the upbuilding of a county, state or nation. That commonwealth which creates practical laws concerning internal development, whether they have to do with education, finance or transportation, and advocates, supports and defends such laws, will not make a mistake. Frequently opposition to public roads propositions arises. If the basic principles upon which these plans are laid are all right, prejudice and antagonism will be reduced to a minimum. It may require time to unify all interests, but it can be done; and all who have the best interests of the people at heart should come forward and demonstrate their desire and ability to support every practical proposition looking to the improvement of the country and the uplift of mankind.

There is a universal cry for good roads. That appeal will be heeded and fulfilled if we work together and pull together.

Much is said about cooperation. We believe in its principles, and the good roads proposition is one which should receive the serious cooperation of every citizen. If all follow the cooperative spirit, good roads will exist everywhere.

There is an air of activity throughout the South which pleases those who have worked for the upbuilding of this part of the country. It is gratifying to see the counties on the line of the Southern Railway in North Carolina so deeply interested in the good roads movement. Years ago we began a campaign in that interest, urging people to take a deep interest in the subject, predicting that such action would redound to the advantage of all. I feel confident no one has reason to regret having supported the movement.

Making Arrangements for the American Road Builders' Association.

The recent announcement by the association of State Highway Departments that it will hold its ninth annual meeting at Chicago, December 15 and 16, has met with much favor, especially by members who are also members of the American Road Builders' Association, and who have places on the program of the Fifth American Good Roads Congress, which meets at the International Amphitheatre, Chicago, during the week of December 14.

Mr. A. R. Hirst, state highway engineer of Wisconsin, is president of the association of State Highway Departments, the memberships of which is limited to State Highway Engineers and commissioners, and a few others who have become conspicuous for particular achievements in road building. During the more than eight years of its existence, many technical and scientific problems of highway construction and maintenance have been worked out, and far-reaching results achieved. The sessions of the association are being arranged so as in no way to conflict with the program of the congress.

The program of the congress is now practically complete. In addition to various routine matters, it contains fourteen original papers on separate subjects, prepared by men actively engaged in the particular work described, to be read by their authors. Each subject,

after the presentation of the paper, will be discussed in set addresses by two to five persons who have a familiarity with the work, which discussion is intended to bring out all phases of the subject. Then an open discussion from the floor of the convention hall will be in order, so that every point may be fully covered.

Applications for space in the good roads show are still coming in considerable volume. Even the applications already received will make this the largest and most complete exhibition of road materials, machinery and accessories that has ever been assembled in this or any other country.

A special rate of two cents a mile has been granted within their respective territories by the Trunk Line Association and the Central Passenger Association. Tickets will be sold December 12-13 and 14 and will be good returning to reach original starting point not later than December 22.

Special trains from New York and Boston over the New York Central lines and from Philadelphia over the Pennsylvania have been arranged for. The Boston train will leave South Station at 10 o'clock a. m., Monday, December 14, arriving at Chicago Tuesday, December 15 at 12:05 p. m. Round trip fare \$39.65. The New York train will leave Grand Central Station at 9:30 Monday morning, connecting with the Boston train at Albany. Round trip fare \$37.30. The Philadelphia train will leave Broad Street Station at 1:12 p. m. Sunday, December 13, reaching Chicago Monday, December 14 on the schedule of the Pennsylvania Limited. Fares each way are as follows: Philadelphia \$16.25; Harrisburg \$14.25. Further information concerning these trains, sleeping car reservations, etc., may be secured from the following:

Boston, J. M. McCarthy, 15 Ashburton Place; Philadelphia, D. T. Pierce, Land Title Bld.; Baltimore, R. Keith Compton, City Hall; New York, E. L. Powers, 150 Nassau St.

Road Engineering Course at University of Tennessee.

The Nashville Banner notes that a short course in Highway Engineering will be held during the first eight weeks of the year, beginning Monday, January 4, ending Saturday, February 27, at the University of Tennessee, Knoxville. The state is spending immense sums annually for building better roads, and there is great demand for engineers better prepared to do the work.

The courses offered are planned to meet the needs of men who have been too busy at work to attend an engineering college, men who have learned from experience their need of additional training in mathematics, drawing, etc. No entrance examinations are required. There will be no fees to pay. There is no age limit except that no one will be admitted under the age of 18.

During the last week of the short course for highway engineers will occur the conference for good roads, better described as a school for road builders. This will be under the leadership of members of the University Faculty ably assisted by some of the best highway engineers of the country, including a lecturer from the Office of Public Roads at Washington, several state highway engineers and other leading experts in road building and maintenance.

This conference is planned by an executive committee as follows: Dr. A. H. Perdue, State Geologist of Tennessee; Thos. B. King, Commissioner of Shelby county; J. A. Reagan, Highway Engineer, Roane county; R. O. Gallaher, Highway Engineer, Knox county, and Dean Ferris of the University Faculty.

The lectures and discussions will be conducted for the direct benefit of the men of Tennessee who are responsible for the building and maintenance of country

roads—the county engineers, county surveyors, members of pike and bridge commissions and road supervisors. Tennessee is spending great sums yearly for road building. The state university can help the counties to get larger returns for the money expended.

Every county in the state should send representatives to this road conference.

George Fitch on Illinois Roads.

George Fitch, the Peoria, Illinois, humorist has the following article in Collier's on the effort now being made to pull Illinois out of the mud:

Illinois is making every effort to improve its roads. After trying every known method it now proposes to roof them over with concrete, thus allowing traffic to ride over them instead of through them.

This is a peculiar proceeding on the part of Illinois because she owes her early greatness to her famous mucilaginous mud highways. A century ago the tide of immigration set westward from Ohio and points east. It got as far as Illinois and then stopped—because it couldn't get any farther. Thousands of hardy pioneers tugged, dragged, pried, and otherwise coerced their moving wagons into the bosom of Illinois—the soft, yielding, gluey, gurgly bosom—then they gave up in despair and raised a crop. That settled it. When they found how useful the Illinois mud was except for road making purposes they stayed on and became rich and prosperous. Lincoln's folks struggled knee deep through Illinois as far as Decatur and then settled down to wait for good roads. While they were waiting Lincoln grew up and was elected president. If Illinois roads had been navigable in the twenties of the last century, Lincoln might have been given to the nation by Iowa or Missouri—but the soil held on to him with such desperate energy that he never got west of Springfield.

However, not even history and early service can save the rare old three-dimension Illinois gumbo road. The state desires thoroughfares which will not climb affectionately into the foundered automobile and creep into the watch pocket of the traveler. More Americans are traveling by automobile now than ever journeyed by stagecoach in the brave old days, when a city on a good post road became a metropolis because of the traffic which passed through it, and the state which meets these travelers at its borders with a chuck hole and a team of horses is not wise.

Good Roads Pointers.

The country road is a most important factor in rural life.

A well kept road is an ear-mark of a well-bred population.

Highway improvement is always followed by better living conditions.

The next best thing to a good home is a good road by which to reach it.

Although good roads are expensive to construct, they are of too much value to be neglected.

Bad roads intimately affect the nation's standard of life and its future among the powers of the world.

Good roads and streets are the arteries of community circulation and a town without them is retrogressing.

The rising generation of America will demand quicker inter-communication than is possible on many of the country roads of today.—Homer D. Wade, Stamford, Secretary, Texas Good Roads Association.

GOOD ROADS NOTES

GATHERED HERE *and* THERE

Georgia.

Quite naturally, all Georgia took a great deal of interest in the American Road Congress at Atlanta last month. Governor-elect, Judge Nat. E. Harris, addressed the congress, promising to devote his time and talents to the good roads cause when he assumes the governorship. He promised to investigate the matter of creating a state highway commission for Georgia. His address was one of the big features of "Georgia Day."

"I am soon to be an official of the State," he said, "and as such I can promise you that my endeavors will be for the betterment of the roads of Georgia. I believe the remainder of the administration will be with me on this matter, and that the legislators will appreciate the importance of the cause."

"Show us what is to be done and we will put our shoulders to the wheel. We propose that in a few years Georgia shall have the name of possessing the finest laid out roads in the union, not excepting your great states of the north."

Judge Harris recounted his experience in coming to Georgia from Tennessee half a century ago, when he was forced to make his way along a winding and narrow trail that was better to avoid than to travel on.

"I went back over this section of Georgia a few months ago," said the judge, referring to his campaign of the state in the recent primaries, "and where that trail once was I found fine turnpikes. If the degree of civilization is indicated by the progress in road building, then Georgia can take a stand with the first of the Union."

"We are trying out a new system and our advancement has been rather rapid in recent years. I know that the people of the state appreciate the value of good roads to the increase of land values the stimulating of trade, and even to the health of the rural communities. We may look for greater progress in the future."

Judge T. E. Patterson, of the Georgia Prison Commission, spoke briefly before the congress, outlining the Georgia system of road building and emphasizing the vast benefit to the state convict labor on the roads had been.

Dr. C. M. Strahan, chief engineer in the school of engineering at the University of Georgia, delivered an interesting address on the use of top soils in building rural roads in Georgia. He declared that the plan had proved economical and generally satisfactory for counties which could not afford a more expensive material.

More than 10,000 miles of improved roads have been built in Georgia, according to Dr. Strahan, and much of this mileage has been surfaced with top soils taken from fields and tracts of land in the vicinity of the road improvement.

Dr. Strahan exhibited a section of top-soil roadway, composed of an admixture of clay and sand, which had almost the hardness of a concrete pavement. He described at length the method of determining the quality of the top soils.

* * *

Louisiana.

The call for a good roads convention to be held at Alexandria Dec. 14-15, for the purpose of organizing a

Louisiana state good roads association, is meeting with a hearty and general response throughout the state and the indications are that the convention will be well attended.

A number of the police juries, automobile clubs and other interested bodies already have elected delegates, and others have promised to do so. There are no restrictions or limitations upon the number of delegates allowed. Police juries, good roads associations, automobile clubs, chambers of commerce, civic leagues, women's clubs, and all other clubs and associations throughout the state which may in any way be interested in the cause of good roads, are invited to send delegates. Individuals also are invited to attend. Members of the legislature or other state and parish officers and interested citizens, whether appointed as delegates or not, are invited. It is the desire of the promoters of the movement to make the gathering a big get-together convention for better roads in Louisiana.

John B. Kent of Lake Charles, who is acting in the capacity of pre-convention secretary, told a Times-Picayune reporter that there would be no printed program and that the sessions would be open, free and informal. The convention will open Monday evening, Dec. 14, at 8 o'clock and adjourn Tuesday evening at the same hour. Those desiring further information about the convention, and all who expect to attend, should communicate with Mr. Kent at Lake Charles, La.

Among the prominent citizens of the state who have been elected delegates and who are taking a lively interest in the convention are Henry E. Hardtner, T. C. Barrel and E. E. Lafaye.

Among the parishes which have elected delegates are La Salle, Caddo, Orleans, Tangipahoa and Vernon.

* * *

Tennessee.

Plans for the participation of Chattanooga in the good roads mass meeting at Manchester, Coffee county, Tenn., Nov. 28, were further outlined by the Chattanooga Automobile Club. It was arranged that delegations should be sent to Coffee county by all the leading commercial organizations of Chattanooga, as well as the automobile club to urge passage by the county court of a substantial appropriation for the improvement of a now almost impassable section of the Chattanooga-Nashville highway between Pelham and Beechgrove.

Two delegations were organized, one representing the automobile club, the other the Chamber of Commerce. Still others were sent by the manufacturers' association, retail merchants, retail grocers, rotary club, and Chattanooga Academy of Medicine and Hamilton County Medical Society, the last named having been enlisted in the work through an appeal made before them, in meeting assembled, by Treasurer Kirkpatrick, of the automobile club.

There is a great revival of interest in good roads by Coffee county citizens. A very recent issue of the Manchester Times is largely devoted to the subject, the paper favoring a \$12,000 appropriation by the county court for the work in that county on the highway. The only really bad stretch of the Chattanooga-Nashville road is in Coffee county, and if, as now seems probable that is put in good shape, the entire highway will be in good condition. Then, if similar enthusiasm and fa-

vorable action can be stirred up relative to the Nashville-Louisville road, the entire south will be benefitted by a splendid automobile traffic artery tapping the middle states and giving another good connection with all the northern and north-eastern tourists. The Nashville-Chattanooga road is being constantly traveled now but the Coffee county situation gives the route something of a "black eye."

There can be no denying that the good roads propaganda of such organizations as the Good Roads Congress, Hoosier Motor Club, highway associations of Tennessee and other localities, and local clubs like the Chattanooga automobile club, is having an important effect on the communities pierced by roads that should be improved. Just now is recognized as an exceptionally good time to put in hard work for the cause of good roads, because the argument that the European war will increase touring in America is a strong one. For instance, the Manchester Times in working for the appropriation, brings out the estimate that 80,000 motorists in the Ohio river states will tour the south in 1915, and emphasizes the value to Coffee county, etc., if they pass that way.

Even the Knights of Pythias in the Chattanooga district are behind the Coffee county movement, because the Pythian home at Ovoca, near Tullahoma, will be more accessible if the Welham-Beechgrove link in the highway is improved.

* * *

Texas.

There will be no substantial excuse for any city or community in this state being in the "mud" after December 1st and 2nd, according to Governor O. B. Colquitt, who has designated these dates as official "Good Roads Days" in Texas.

The citizens of many towns and villages will avail themselves of this opportunity to build good roads and will show their interest in the work by donning overalls and doing manual labor on these dates.

Although the wielding of the pick and shovel will be no diversion for the farmer, he is more than willing to co-operate with the city man in this work and it is believed a large force of the tillers of the soil will join hands with the townsmen Tuesday and Wednesday and help substantially increase the good road mileage in the Lone Star state.

The split log drag will be very much in evidence on the highways of Texas on December 1st and 2nd, as this implement is indispensable in road construction.

* * *

West Virginia.

The next meeting of the Southern Appalachian Good Roads Association will be held at Bluefield in the month of October, 1915. Every county in the state will be requested to have an exhibit on this occasion. This is a great opportunity for West Virginia and should mean much towards the advancement of the Pittsburgh, Bluefield and Bristol highway which is being vigorously pushed in some sections. The counties in West Virginia through which this road passes will doubtless make every effort to have it in passable shape by the date of this meeting. When the road is completed through West Virginia it will mean a highway from the lakes to the gulf with the West Virginia scenery as the center of attraction.

Prof. Russell L. Morris and Chief Road Engineer A. D. Williams, have been invited to deliver lectures at the Kentucky Good Roads School at Lexington and also to assist in instruction from January 4-16, 1915. Both of these men have accepted and will devote their

time to the subjects "Good Roads Improvement" and "General Highway Construction."

Chief Road Engineer A. D. Williams, and S. G. Brown, city engineer of Charleston, attended the American Road Congress in Atlanta. Both of these men delivered addresses, Mr. Williams speaking on "Grades and Excavations" and Mr. Brown talking on "Streets and Pavements." Besides these, various other West Virginians took part in the discussions.

The motion picture, as a means of instruction, will make its appearance at the West Virginia University during the second annual road school, in December. It will be used to supplement the lectures on various subjects as well as for a comparison of the results being accomplished in the various parts of the country, relative to road improvements and highway construction.

* * *

Wyoming.

Wyoming's legislature, during the coming session, will have several proposed good roads measures to consider. Efforts to secure state aid for good roads in that state, have signally failed. Gov. J. M. Carey, the present incumbent, and who will be succeeded January 1, by John B. Kendrick, democrat, two years ago vetoed a bill which provided that counties might vote bonds for the construction of roads and bridges. In using the veto power, he held that the financial condition of a number of the Wyoming counties, made such a move an unwise one for several years to come. Wyoming has no good roads commission and no funds for building and maintaining roads and bridges other than the small amount collected by taxing automobiles.

One bill which will be presented the next legislature will provide for the permanent construction of highways and bridges, by a system of districting the counties, according to the importance of the roads and their mileage, and permitting the taxpayers to vote on an optional bond issue.

The two Yellowstone, one Black Hills and the Lincoln highways, have created a division of opinion among residents of Wyoming as to road improvement in that state. Those located on none of these highways are generally averse to state aid and feel that the counties through which they pass should bear the burden of building and upkeep. The proposed county bill would seem to be a solution of the matter.

Urges U. S. to Build Roads to Give Work to Jobless.

It is claimed that unemployment in the United States will be greatly diminished if John F. Smulski, vice-president of the Chicago Association of Commerce, can get the federal government to adopt his plan for a system of nationally built highways.

"Two of the worst problems in America today," said Mr. Smulski, "are bad roads and unemployed. Each is becoming daily more urgent with the growth of the country. Because of the pressing need of some solution of the unemployment problem at this time, an effort will be made by several interests at the American good roads congress and good roads show, probably on Chicago day, Dec. 15, to get a unanimous indorsement of the plan so that a strong showing can be made before congress.

"The national highways act should provide an employment department. At convenient centers the government should maintain offices where any man out of work may go and demand the same as his right."

Little Rock, Ark., will macadamize six miles of streets at a cost of \$40,000.

GOOD ROADS NOTES IN BRIEF

It is announced from Floresville, Tex., that road districts No. 2 and No. 3 will vote on bond issues of \$13,000 and \$18,000 on the 15th of December.

Creek county, Okla., will vote soon on a bond issue of \$200,000 for roads. Macadam construction is contemplated.

The Board of Public Works of St. Louis has let a paving contract for \$24,741.

Tarpon Springs, Fla., will lay 2,000 yards of sand-asphalt pavement.

Aiken county, S. C., has been asking for bids on a large amount of excavation and 24,000 cubic yards of and for sand-clay surfacing.

Road District No. 2 of Grimes county, Tex., will spend \$50,000 in building roads.

Dallas, Tex., has been asking for bids on about \$30,000 worth of street paving.

Edina, Mo., will pave six blocks with brick blocks on a concrete base.

The Fiscal Court of Rockcastle county, Fla., will build ten miles of good road.

DeLand, Fla., votes this month on a bond issue of about \$25,000 for streets.

Madison county, Ala., will vote soon on a bond issue of \$70,000 for road construction.

Navarro county, Tex., has contracted for excavating and filling on a 68-mile system of concrete roads.

Marion county, Ala., has available for road work \$65,000 and has contracted for the grading of 50 miles of road.

Houston, Tex., has contracted for street improvement recently amounting to about \$15,000.

Coffee county, Tenn., has contracted for the grading of 50 miles of road at a cost of \$8,000.

Salisbury, Md., has contracted for 11,000 yards of bituminous pavement, to cost \$18,000.

Temple, Tex., will gravel 20 miles of street at a cost of \$140,000.

Birmingham, Ala., will spend about \$14,000 on street improvements.

Tallapoosa county, Ala., will construct 32 miles of road.

Dallas, Tex., has contracted for the paving of six additional streets at a cost of \$150,000.

Mercer county, W. Va., will grade and macadamize 72 miles of roads.

Selma, Ala., will lay 1,700 square yards of concrete pavement.

St. Joseph, Mo., will spend \$40,000 in paving streets.



BRIDGES & CULVERTS

Bradley county, Ark., will bridge the Saline river at a cost of \$16,500.

The commissioners of Cross county, Ark., are reported to be asking for bids on 15 bridges.

Lee county, Fla., has secured permit from the War Department to bridge the Caloosahatchie river.

Hogans creek, at Main street, Jacksonville, is to be bridged at a cost of \$5,000.

The city of Jacksonville, Fla., in conjunction with other interests, will build a bridge at Duval street to cost about \$175,000.

Newton county, Miss., has contracted for 18 bridges. A bridge 1300 feet long is to be built across the Osage river at Lisletown, in Cole county, Ark.

Davidson county, Tenn., is preparing to build seven re-inforced concrete and steel bridges.

Louisa county, Va., will build a bridge 75 feet long over Little river.

Campbell county, Va., will build a bridge 105 feet long over Flat creek, near Rustburg.

Mercer county, W. Va., will build three steel bridges across Bluestone river.

Pittsylvania county, Va., will bridge Staunton river.

BRIDGES AND—
Campbell county, Va., will construct a bridge across Falling river.

Mercer county, W. Va., has contracted for three re-inforced concrete bridges across Bluestone river.

Victoria county, Tex., will bridge Coletto creek at a cost of \$9,000.

San Antonio, Texas., has let contract for St. Mary's bridge to cost nearly \$15,000.

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The Road Situation in Kentucky.

Mr. Robert McBride, Jr., president of the Kentucky Good Roads Association, addressing a meeting of road enthusiasts in Louisville, called together for the purpose of boosting the campaign for 300 members for the Jefferson county division of the state organization, gave his hearers much to think about. Among other things Mr. McBride said:

"In the greater number of counties in Kentucky, the present method of road building is the same as that which obtained in England in the days of Queen Elizabeth, with the modern trimmings of the contractor with a pull and the magistrate who believes that politics, like death, has all things for its own. The result is that we have been spending some \$2,000,000 a year for roads in Kentucky with no roads to show for it.

"One hundred years ago, Kentucky put into operation the plan of state aid. Seventy-five years ago that plan was discontinued. But in the interval practically all of the improved highways to which the state can now lay claim were constructed. The counties that got the lion's share were the counties of the Bluegrass.

"Kentucky has 10,000 miles of improved roads, but there are eighty-nine pauper counties and sixty-six, or more than one-half, without a single mile of improved road. The counties that the state aided a hundred years ago are found in neither column. They are and for seventy-five years have been, the richest in the state.

"You men who are here to-day represent the combined business organizations of Louisville, the chief city in Kentucky. You are here because you believe that the building of good roads is or should be a business undertaking. You are here at a time when Kentucky has just waked up from a sleep of seventy-five years. When the right of the state to grant aid in the building of roads has been restored by constitutional amendment. When the granting of that aid is safeguarded by the condition that not a dollar of the state's money is to be paid out until the roads constructed with state aid conform to the specifications drawn up and laid down by the state bureau of good roads. The local magistrate and the contractor with a pull are to be no longer the court of last resort.

"If the money raised for road building with state aid is not intelligently expended the head of the state bureau and his assistants and the governor who appoints them can be held responsible. For the first time responsibility is to go with authority.

"You are here at a time when the plan to construct a state-wide inter-county-seat system of highways, 6,200 miles in extent, has received the official approval of the general assembly and the governor and needs only concerted action by the business men and counties to be carried into effect. That system can be completed in fifteen years without federal aid. With federal aid, which is sure to come, in half that time.

"When completed it will make every one of the 120 county seats in Kentucky the center of not less than four roads, each forming an integral part in the state-wide system. Over that system will be hauled 85 per cent. of the road traffic of the state. It will add not less than \$20 to the value of every farm that fronts it. It will increase the value of every product of farm or mine. It will make for good schools, good churches good citizenship.

"It will substitute prosperity for pauperism. Incidentally and selfishly speaking, it will relieve Jefferson county of its present burden of having to pay each year more than one-third of the state's taxes.

"If you as business men believe that the construction of this system is worth while as a business proposition

and a patriotic endeavor, you will give to the Kentucky Good Roads Association, which has volunteered for the war, your membership aid support. If not, the demagogues in the next general assembly, on the plea of retrenchment and reform will put the state back into the agricultural and industrial coma in which it has slumbered for the last seventy-five years. It will be a long time before it is again awakened."

The membership campaign was a big success. The first day saw the passing of the 300-mark and when the campaign was over more than 400 had enrolled.

An Old Road Builders' Experience.

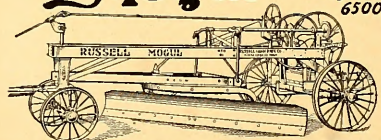
To the Editor of Southern Good Roads:

As a member of the Good Roads Association of Virginia, I take the privilege, as well as I think my duty, to give in a little of my experience, as railroad constructor, county and state road builder for more than forty years. I have been with the State Highway Commission for nearly six years and my experience may be worth something.

I have built most of sand clay and gravel roads in this lower country. Clay and sand are both scarce, that is good clay and sand, but such as we have will make good roads by proper maintenance. It is useless to build good roads or anything else unless we properly maintain them. My method for the past twenty-five years, has been to first grade and drain the roads, mix sand and clay, then put on a top soil. After this is worked in and you get a hard pan, or foundation, then keep it level with a small road machine and road drags. Drag the road when in right condition. If it rains to day, say, wait one day then next day drag. You can drag ten miles per day with one pair of mules. Building and

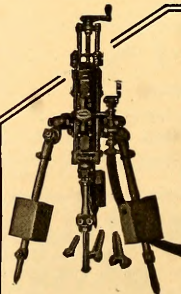
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maintenance for one year will cost about \$400 per mile. If you can gravel with a clay gravel, average depth six inches, make an eight inch crown and run off to a feather edge at sides, making a roadway sixteen feet in width. This will give you one of the best roads I know of.

The advantage that a gravel road has over a crushed stone road, is that the gravel is a smooth surface and packs with the clay filler.

This makes a fine binder, while the crushed stone road has a rough surface and satisfactory binder. Being a rough surface the continual jar of vehicles passing over the road loosens the stone and soon causes the road to go to pieces.

The gravel, until it packs below freezing, will get in small holes, and it is always best to keep a supply on hand. It takes a very little to fill up the holes and keep the road level. The cost of this kind of road is about \$2,500 per mile. Any information that I can give any one along this line I will gladly give, for I know of no better monument that I can leave than a good road.

I am now 65 years old and if I can live long enough to see good roads in the state of Virginia, I will die saying "Well Done."

H. T. WADDELL,

Superintendent State Highway, Suffolk, Va.

Chicago-to-Florida Highway.

With a view to building and establishing a great highway between Jacksonville and Chicago, or between the Great Lakes and the gulf, a direct highway, which shall pass through Atlanta as one of its main points of interest and importance, William Snyder Gilbreath, of Indianapolis, Ind., called upon Governor John M. Slaton, of Georgia, on Monday, Nov. 9, the opening of the American Road Congress.

Mr. Gilbreath, who is a prominent factor in the good roads movement in the middle west, was in Atlanta for the fourth annual American Road congress and in the interest of this great highway.

The new route is to be called "The Cotton Belt Route," unless those states which have become interested in it may choose another name.

Mr. Gilbreath went to Atlanta with a letter of introduction and indorsement from Governor Samuel M. Ralston, of Indiana.

Governor Slaton pledged to Mr. Gilbreath his co-operation in whatever plan the governors of other states interested might evolve. This insures the co-operation of Georgia in the promotion of one of the greatest highways ever proposed in the United States.

Mr. Gilbreath intends to work up sufficient sentiment in these states through which the proposed highway will pass to warrant the activities of the states in the promotion of the highway.

Mr. Gilbreath is quoted by the Atlanta Constitution as follows:

"At the present time there are almost two million motor cars in the United States. In the middle states, immediately north of the southern states, there are over 600,000 automobiles, while the southern states have only 104,000 cars. Touring in the southern states is entirely closed to the 600,000 owners of automobiles in the middle western states, and these 600,000 want to go south in the fall and winter months in their machines. It is, of course, impossible to fix up all the roads in the south, but it is not at all impossible if the same concerted effort is put on one direct road through from Louisville to Jacksonville, that this road could be repaired, put in good condition and ready by next fall for the thousands of tourists who would gladly flock to the south."

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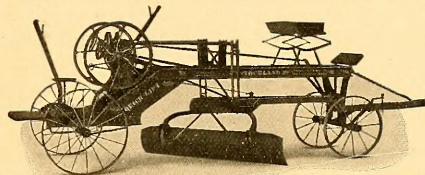
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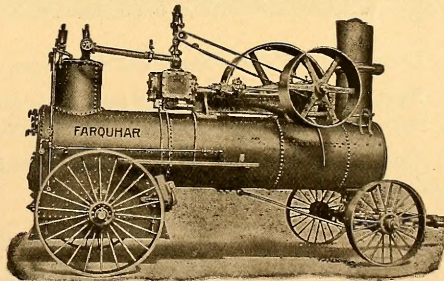
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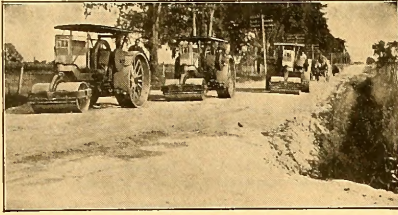
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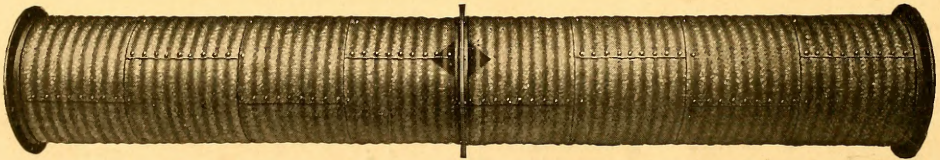
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